7/3-01
filecopy

U.S. ARMY CORPS OF ENGINEERS
PERMIT APPLICATION

FLOOD CONTROL IMPROVEMENTS
COYOTE CREEK PROJECT --REACH 3

SANTA CLARA COUNTY, CALIFORNIA

Applicant:

Santa Clara Valley Water District, California

August 17, 1993

TC
425
C69.U7
1993
c.3
LIBRARY

TC425C69U71993c.3

Contents

Section **Page**

Executive Summary

Permit Application Form 4345

1 **Project Description** **1-1**
1.1 Introduction 1-1
1.2 Proposed Project 1-3
1.3 Purpose of and Need for the Project 1-5

2 **Section 404(b)(1) Alternative Analysis** **2-1**

3 **Description of Corps Jurisdictional Areas** **3-1**
3.1 Wetlands (Special Aquatic Sites) 3-1
3.2 Other Special Aquatic Sites (riffles, spawning gravels) 3-2
3.3 Existing Functions and Values 3-3

4 **Impact Analysis and Proposed Mitigation Measures** **4-1**
4.1 Impacts on the Aquatic System 4-1
4.2 Impacts on Resources Outside the Aquatic System 4-5
4.3 Summary of Cumulative Impacts 4-7
4.4 Public Interest Factors 4-9

5 **Mitigation and Monitoring Programs** **5-1**

6 **References** **6-1**

Appendix A. Environmental Reports
Appendix B. Jurisdictional Waters and Wetlands Report
Appendix C. Habitat Mitigation and Monitoring Program
Appendix D. Fisheries Mitigation and Monitoring Program

SANTA CLARA VALLEY WATER DISTRICT
LIBRARY
[illegible] ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118

Tables

Number

2-1 Alternatives to the Coyote Creek Project Considered by the 1987 FR/EIS . 2-2
4-1 Mitigation Objectives for Impact to Fish Habitat to be Caused by Reach 3 Lower Coyote Creek Flood Control Project 4-3
4-2 Applicability of the 20 Public Interest Factors Listed in 33 CFR 325.3(c)(1) to the Coyote Creek (Reach 3) Flood Control Project 4-10

Figures

Figure 1. Regional and Vicinity Map.
Figure 2. Project Location Showing Reaches 1-3.
Figure 3. Limit of Reaches 3A and 3B of Coyote Creek.
Figure 4. Proposed Reach 3A Activities.
Figure 5. Proposed Reach 3A Activities.
Figure 6. Proposed Reach 3B Activities.
Figure 7. Proposed Reach 3B Activities.
Figure 8. Proposed Reach 3B Activities.
Figure 9. Reach 3 Typical Section.
Figure 10. Overflow Channel and Crossover Area - Plan View
Figure 11. Overflow Channel and Crossover Area - Cross Section.
Figure 12. Fish Passage Creek Modifications Under SR 237 - Plan View.
Figure 13. Fish Passage Creek Modifications Under SR 237 - Cross Section.
Figure 14. Rock-lined Area at Montague Expressway Bridge - Plan View.
Figure 15. Rock-lined Area at Montague Expressway Bridge - Cross Section.
Figure 16. Proposed Riparian Revegetation Mitigation Sites.
Figure 17. Limit of Jurisdictional Waters and Wetlands at the Crossover Area.
Figure 18. Typical Section of the Seasonal Wetland Area.
Figure 19. Limit of Jurisdictional Waters and Wetlands at SR 237.
Figure 20. Limit of Jurisdictional Waters and Wetlands at Montague Expressway.
Figure 21. Spawning Redds and Potential Spawning Sites for Reaches 3A and 3B.
Figure 22. Soils Contamination in Reach 3.

DRAFT EXECUTIVE SUMMARY

[This executive summary has been prepared in the format of a public notice. Since the public notice is formally issued by the Corps, this executive summary is therefore designated as a draft].

Flood Control Improvements Permit Application
Coyote Creek Project -- Reach 3
Santa Clara Valley Water District
August 17, 1993

---

1. The Santa Clara Valley Water District (Water District), 5750 Almaden Expressway, San Jose, California 95118 (Contact: P. Kay Whitlock, telephone: 408-265-2600), has applied for a Department of the Army authorization to construct a portion of the Coyote Creek Flood Control Project along a 2.5-mile section (Reach 3) of Coyote Creek between State Route (SR) 237 and Montague Expressway in Santa Clara County. Reach 3 is divided into two portions, designated as 3A, Stations 577+00 to 634+00, and 3B, Stations 566+00 to 577+00 and 634+00 to 696+00. This project is being processed pursuant to the provisions of Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. The purpose of the proposed project is to provide 100-year flood protection along Coyote Creek in the Cities of San Jose and Milpitas, California. Flooding on Coyote Creek within the project area has been a recurring problem since the early 1900s. Severe flooding during the winters of 1982 and 1983 damaged hundreds of private and public facilities by inundation. The Coyote Creek project, divided into Reaches 1, 2, and 3, is located along the lower portions of Coyote Creek in the northeastern portion of Santa Clara Valley, extending approximately 7 miles from the southern tip of San Francisco Bay to the Montague Expressway in the Cities of San Jose and Milpitas.

The Water District completed construction of Reaches 1 and 2 (San Francisco Bay to SR 237) of the Coyote Creek Program between 1985 and 1992. The Water District proposes to complete construction of Reach 3 in 1994.

The following is a summary of the majority of construction activities that would occur and may have impacts within the jurisdiction of the Corps.

Construction activities associated with the proposed project along

Reach 3 would include the following:

a. construction of offset levees outside the existing channel,

b. excavation of an overflow channel between the existing channel banks and the new offset levees,

c. construction of patrol roads on the levee crowns and along the bottom edge of the levees,

d. realignment of a section of the creek, cutting off a portion of the existing channel about 1,000 feet upstream of SR 237, and

f. placement of concrete and/or rock lining at SR 237 and at Montague Expressway.

The overflow channel would be located parallel to the existing creek corridor, crossing the creek in one location in Reach 3A, in the area of the realigned section. For most of its length in Reach 3, the overflow channel would be located on the west side of the existing creek, crossing over to the side at a sharp bend in the creek about 1,000 feet upstream of SR 237 in Reach 3A. At this location, the existing creek channel would be cut off, portions of it would be filled, and a realigned section would be constructed from about Stations 590+00 to 594+00.

In the vicinity of the channel realignment, about 1,000 feet south of SR 237 within Reach 3A, construction of the setback levees would require filling wetlands within two small excavated depressions that pond with local runoff in the spring.

In Reach 3B, rock lining would be placed under the Montague Expressway Bridge and in the transition on either side of the bridge between Stations 686+00 and 695+00. Existing levees would be removed and the channel banks lined with rock at points where the overflow channel would cross the existing creek channel.

Additional construction in the northern section of Reach 3B would include a concrete-lined trapezoidal channel with rock lining transitions under SR 237 between Stations 566+00 and 579+00. A low-flow channel and baffles to facilitate fish passage would also be constructed under SR 237 between Stations 566+00 and 579+00.

A riparian revegetation program, developed from a Habitat Evaluation Procedure Analysis performed by the U.S. Fish and Wildlife Service, is included with the proposed project to replace vegetation lost as a result of the flood control facilities construction. In Reach 3, 20.3 acres would be revegetated with middle and upper terrace riparian vegetation. Plantings for mitigation are also planned in setback areas, channel crossover areas, and fishery shade mitigation areas. In addition, seasonal wetland habitat would be created adjacent to areas of the overflow channel west of the existing levee in Reach 3A in order to mitigate for the partial loss of the existing seasonal wetlands within the two small excavated depressions.

3. The applicant has been informed to notify the Regional Water Quality Control Board, San Francisco Bay Region, to determine the need for State water quality certification.

If the State Water Resources Control Board determines that this project is consistent with the California Water Quality Control Plan, Requirements adopted by the Regional Board and Sections 301, 302, 303, 306 and 307 of the Clean Water Act, the State will issue a Certificate of Conformance with Water Quality Standards to the project proponent. Those parties concerned with any water quality problems that may be associated with this project should write to the Executive Officer, California Regional Water Quality Control Board, San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland California 94612, by the close of the comment period of this public notice.

4. Corps of Engineers has assessed the environmental impacts of the action proposed in subject permit application in accordance with the requirements of the National Environmental Policy Act of 1969 (Public Law 91-190), and Corps of Engineers' Regulations, 33 CFR 230 and 325. The Preliminary Environmental Assessment presented herein describes only the impacts (direct, indirect, and cumulative) resulting from proposed activities within the jurisdiction of the Corps of Engineers.

Six different environmental analysis reports have been completed for the Coyote Creek Project since 1984. The Water District and others have prepared the following documents:

(1) Final Environmental Impact Report (FEIR) for the Coyote Creek Planning Study (SCVWD, 1984),

(2) Final Environmental Impact Statement (FEIS) Coyote Creek Flood Control Proposal (Corps, 1987),

(3) Feasibility Report and Final Environmental Impact Statement (FR/EIS) for Coyote Creek and Berryessa Creek (Corps, 1988),

(4) Lower Coyote Creek Fisheries Evaluation Report (HRG, 1989), and

(5) Final General Design Memorandum (GDM) for Coyote and Berryessa Creeks, California, Coyote Creek (Corps, 1993), and

(6) Final Environmental Assessment (FEA) for Proposed Refinements to the Coyote Creek Element of the Coyote and Berryessa Creeks Project (Corps, 1993).

The Environmental Matrix (checklist of impacts assessed under NEPA) and other environmental review documents used in preparation of this Preliminary Environmental Assessment are on file in the Impact Analysis Section, Regulatory Branch, Corps of Engineers, 211 Main Street, San Francisco, California.

The Preliminary Environmental Assessment resulted in the following findings:

a. IMPACTS ON THE AQUATIC ECOSYSTEM

(1) Physical/Chemical Characteristics and Anticipated Changes

Substrate - Changes to stream substrate in Reach 3A would occur at the channel realignment section where 900 feet of natural channel would be replaced by a realigned 630-foot rock-lined channel. In addition, 300 linear feet of channel would be rock-lined near SR 237. Changes to stream substrate in Reach 3B include approximately 220 linear feet of rock lining and approximately 690 linear feet of concrete lining associated with construction of the SR 237 Transition Structure.

Impacts in Reach 3B also include construction of approximately 700 linear feet of rock lining within all or portions of the channel at Montague Expressway. Impacts from these changes are described in detail in the section on fisheries habitat below.

Flood Control Function of Wetland - Construction of the west levee in Reach 3A would result in the partial loss of approximately 0.5 acres of the excavated depressions, which collect local runoff.

For both Reach 3A and 3B, flood control functions would be enhanced by implementation of the project.

Water Quality - Impacts to water quality consist primarily of temporary increases in erosion and sedimentation during construction. A Storm Water Pollution Prevention Plan (SWPPP) would be prepared as part of a Nation Pollution Discharge Elimination System (NPDES) permit requirement with the RWQCB. The SWPPP would include measures to control erosion and sedimentation during construction.

(2) Biological Characteristics and Anticipated Changes

Waters - In Reach 3A, there would be a loss of channel length of 270 feet at the sharp bend (ox-bow) where the channel is to be realigned between approximately Stations 590+00 and 594+00. As a result of this realignment, approximately 900 linear feet of pool run habitat would be converted to 630 feet of rocky riffle habitat. For fisheries, no mitigation would be necessary for this loss because the conversion would be to a higher value fish habitat. Impacts to riparian habitat have been addressed in FR/EIS and mitigation would be provided for that loss as part of the Habitat Mitigation and Monitoring Program.

Wetlands (Special Aquatic Sites) - Wetlands are one type of habitat considered to be a "special aquatic site" according to Corps regulations. Wetland areas within the creek banks in Reaches 3A and Reach 3B are similar in character to the riparian vegetation, with a predominance of herbaceous hydrophytic vegetation. In some areas, narrow (up to 4 feet in width) bands of emergent vegetation grow within the low flow channel, and would be lost within the 900 linear feet of creek proposed for construction of the realigned channel.

Proposed activities in Reach 3A would affect 1.9 acres of jurisdictional waters and wetlands. Of this total area, 0.9 acres are wetlands; 0.4 acres of wetlands would be affected within Coyote Creek, and 0.5 acres of potential wetlands would be affected within the excavated depressions. In addition, Excavation of the adjacent overflow channel would cause approximately 0.2 acres of one depression to be excavated deeper, and could indirectly affect an additional 1.2 acres by altering the local hydrology.

Mitigation has been included in the Coyote Creek Reach 3 project for the partial loss of the excavated depressions. Mitigation would consist of creation of new depressions in areas adjacent to the overflow channel west of the existing levee in Reach 3A at a 1:1 ratio (FEA).

Approximately 0.8 acres (33,000 square feet) of new jurisdictional waters would be created within the realigned channel. Portions of this 0.8 acres may form wetland communities; however, the area would not form a woody riparian vegetation community, because it would be maintained to prevent growth of dense vegetation that could impede flood waters.

Within Reach 3B, proposed activities would affect a total of 2.1 acres of jurisdictional areas. Of this total area, 0.7 acres are wetlands. In Reach 3B, installation of rock-slope protection and concrete lining are expected to prevent reestablishment of wetland vegetation. These bridge transition structures are being designed to provide rocky riffle and fish spawning habitat, and not wetland habitat.

(3) Habitat for Fish and Other Aquatic Organisms

Overall Impacts, Reaches 3A and 3B - Short-term sedimentation and turbidity from levee construction and stream-bank grading could have a negative impact on fish. Sediment discharge could adversely affect spawning substrate for the chinook salmon, steelhead, hitch, prickly sculpin, and Pacific lamprey, and create problems for sight feeding fish such as the Sacramento sucker and prickly sculpin. Mitigation measures, such as seeding bare slopes, would be implemented during construction to minimize erosion and sedimentation impacts. Revegetation planned under the Habitat Mitigation and Monitoring Program would also provide erosion and sediment control.

Reach 3 impacts would include:

- higher water temperatures as a result of the removal of riparian vegetation along the creek from construction activities,

- vegetation loss resulting in the loss of hiding and rearing habitat for fish,

- increased potential for sedimentation of spawning gravels resulting from project construction,

- the channel realignment in Reach 3A, resulting in the net loss of 270 linear feet of deep pool and run habitat,

- the rock lining of the creek under the Montague Expressway in Reach 3B, eliminating gravel riffles that have been identified to contain steelhead and salmon spawning sites, and

- concrete-lined channel in Reach 3B under SR 237, which may create high-flow passage problems for chinook salmon and steelhead.

Mitigation measures have been incorporated into the project to address impacts to fish habitat, including in-kind or higher-value habitat replacement, spawning riffle replacement and/or enhancement, abatement of siltation, and the avoidance of vegetation at crossover and bank revetment areas or the replacement of lost vegetation with vegetation offering equivalent cover value.

Shade and Hiding Cover, Reach 3A and 3B - Construction of flood control facilities would result in the loss of trees along Reach 3 of Coyote Creek. Riparian vegetation losses are described in detail in the FR/EIS and FEA. Because steelhead trout and chinook salmon are considered cold water species, appropriate riparian shade cover would be replaced to cool the stream. Mitigation for the reduction of vegetation would occur in Reach 3 and has already been undertaken in Reach 2. Plantings would occur in areas that do not currently support shade-producing vegetation or hiding cover. To mitigate for the loss of near bank cover in Reach 3, 2-foot diameter rip-rap would be used.

Rocky Riffle and Spawning Riffle Habitat - Riffle habitat would be affected by the proposed project at three separate areas, including the channel realignment (Reach 3A), concrete-lined section at SR 237 (Reach 3B), and rock-lined channel under Montague Expressway (Reach 3B).

Channel Realignment: Construction of the channel realignment in Reach 3A would result in the conversion of 900 linear feet of pool/run habitat to 630 feet of rocky/riffle habitat, resulting in a net loss of 270 linear feet of deep pool and run habitat. No mitigation would be necessary because the conversion would be to a higher value habitat for fisheries.

The channel realignment creates the potential for siltation (loss) of about 30 linear feet of spawning riffle downstream of the channel alignment. Mitigation for the potential loss includes monitoring and potential replacement/ enhancement of the spawning riffles with gravels at a ratio of 2:1.

Concrete-lined section at SR 237: The proposed concrete-lined channel under SR 237 may pose passage problems and habitat loss for certain fish species. Because of the predicted high stream velocities in the low-flow channel, steelhead and salmon may find it difficult to migrate up this section of the creek. Creation of a low-flow channel and installation of velocity dissipating baffles in the low-flow and high-flow channels would be used as mitigation to reduce the effects of this potential velocity barrier.

The concrete-lined channel would also eliminate 250 feet of rocky riffle areas that provide fish spawning sites. Proposed mitigation for this impact includes the placement of rock rip-rap upstream and downstream of the proposed concrete apron to replace lost habitat.

Migration for steelhead and salmon will take place during the late fall, winter, and spring months under high flow conditions. Additional baffles, similar to those in the low flow channel, would be placed along the concrete inverts of the overflow channel to ease fish passage over the concrete apron.

Rock-lined channel under Montague Expressway: The FEA calls for the replacement of approximately 300 linear feet of combined pool-run (80 percent) and salmonid spawning riffle (20 percent) habitats with rock-lined channel under the Montague Expressway crossing. The rock-lining may result in degradation/ siltation of marginal spawning gravels downstream. Mitigation for this loss would be the reconstruction and enhancement of the riffles near the site of the destroyed riffles, including the replacement of gravel at a ratio of 2:1. The specific locations of gravel replacement would be determined by the Water District in consultation with California Department of Fish and Game before channel modification.

b. IMPACTS ON RESOURCES OUTSIDE THE AQUATIC ECOSYSTEM

(1) Biological Characteristics and Anticipated Changes

Vegetation and Wildlife - The FR/EIS and FEA identified significant impacts to riparian vegetation and wildlife species including loss of existing riparian vegetation, loss of wildlife habitat associated with that vegetation, and impacts to wildlife from the creation of breaks along the riparian corridor at the crossover and realignment areas.

The lower Coyote Creek flood control program would cause a loss of 13.6 acres of the existing riparian vegetation, or 14.5 percent of the existing riparian trees along Reaches 1 through 3 of Coyote Creek. Most of this impact would occur at the crossover and realignment areas. The FR/EIS and FEA call for 32.5 ares of revegetation with upper and middle terrace riparian vegetation within the project element as described in the Habitat Mitigation and Monitoring Program. Of this area, 20.3 acres would be revegetated in Reach 3. In addition, plantings are planned in setback areas, in crossover areas (where the overflow channel crosses over the existing channel), and in fishery shade mitigation plantings. The FR/EIS and FEA evaluated these impacts and requisite mitigation for Reaches 2 and 3 as a whole, and did not provide separate evaluation for Reaches 2 or Reach 3 or sub-portions thereof.

In Reach 3A, impacts to vegetation and wildlife would consist of loss of the sharp bend in Coyote Creek about 1,000 feet south of SR 237, at the realignment and crossover area. About 900 linear feet of channel would be cut off and replaced by a rock-lined channel section of about 630 feet in length. Refinements to the Reach 3A in the FEA and Refined Authorized Project Plan have resulted in the preservation of about 300 linear feet of riparian vegetation originally expected to be lost near Station 616+00 under the original project description.

In Reach 3B, construction of the concrete-lined channel under SR 237 could create a barrier to wildlife movement. However, a bench beneath the SR 237 bridge has been incorporated into the design to facilitate wildlife migration along the creek.

The FR/EIS concluded that the revegetation program would provide new habitat for those species that survive the initial construction impacts. Floodway habitat profiled by the overflow channel would replace upland and agricultural land, which is expected to increase wildlife use of the project area over time.

Endangered Species - The Corps consulted with the USFWS regarding endangered species issues during the preparation of the FEIS, FR/EIS, GDM and FEA.

The federally-listed peregrine falcon (Falco peregrinus) has been observed foraging in Reaches 2 and 3. The saltmarsh yellowthroat (Geothlypis trichas sinuosa) and tri-colored blackbird (Agelaius tricolor), identified by the USFWS as Category 2 candidates for listing, are known to utilize riparian vegetation along Coyote Creek. Impacts to foraging and perching habitat for the peregrine falcon would be mitigated through implementation of the revegetation plan. Loss of potential nesting habitat for the saltmarsh yellowthroat an tri-colored blackbird would be mitigated through the revegetation plan.

The California red-legged frog, (Rana aurora draytonii), recently proposed for listing as endangered, was observed during 1984 field surveys of Reach 3 (FEIS). The foothill yellow-legged frog, (Rana boylii) and the western pond turtle, (Clemmys marmorata), federal Category 2 Candidate species, were also observed in Reach 3 (FEIS). Subsequent environmental documents that discuss detailed fisheries and aquatic surveys do not report further sightings of these species in Reach 3.

Mitigation measures for impacts to aquatic habitat were developed and would be implemented through the revegetation and erosion control plans. The revegetation plan is described in detail in the Habitat Mitigation and Monitoring Plan.

(2) Socioeconomic Characteristics and Anticipated Changes

Since 1986, the portion of Coyote Creek from just north of the Montague Expressway to its mouth has been shown to be a part of the Bay Trail Master Plan. The Refined Authorized Project Plan would include public access trails in all three reaches, which would be in compliance with the Master Plan. In Reach 3, a trail segment would be included on the west levees of Coyote Creek.

The FR/EIS concludes that no significant impacts to recreation would result from the proposed project, because it describes recreational features such as trails that have been incorporated into the new offset levees as compatible with the flood control facilities.

(3) Historic-Cultural Characteristics and Anticipated Changes

As described in the FEA, the State Historic Preservation Officer has concluded that prehistoric archaeological site CA-SC1-675, located in Reach 3, is eligible for the National Register of Historic Places. This is the only site in Reach 3 determined to be eligible for listing. This site cannot feasibly be avoided because project redesign in this area would not allow the Reach to function in a hydraulically acceptable manner.

Consultation would be undertaken by the Water District to develop a Memorandum of Agreement with the State Historic Preservation Officer that would outline appropriate mitigation, which may include, but not be limited to, data recovery (i.e., excavation and reporting on the finds).

In addition, consultation with appropriate Native Americans would be undertaken to determine procedures for the treatment of human and cultural remains associated with the site, should any be discovered during construction. The site would not be disturbed by revegetation plans. The procedures established to address the known site would also address the treatment of artifacts for any archaeologic remains related to descendant Native Americans that may be discovered elsewhere in the project area.

(4) Hazardous, Toxic, and Radioactive Waste

Five areas of contamination were found in Reach 3 as a result of Water District investigations. In Reach 3A, oil and grease-contaminated soils were found at Station 605+00 on both sides of the creek. In addition, concentrations of 900 parts per billion of DDE, a pesticide, were found at Station 615+00. Along the east bank of the creek in Reach 3B from Stations 660+00 to 680+00, trichloroethane, acetone, and Freon 113 were found in the soil. The Water District is planning cleanup and disposal of two sites that could present a potential risk during grading and construction activities.

Implementation of these measures would adequately mitigate potential impacts and no further mitigation would be necessary.

c. SUMMARY OF CUMULATIVE IMPACTS

(1) Water District and Corps Coyote Creek Projects

Coyote Creek watershed comprises approximately 322 square miles, making it the largest watershed in Santa Clara Valley. The creek extends from its outfall into the San Francisco Bay upstream 75 miles to the limit of Water District jurisdiction in the east foothills above Anderson Reservoir. The Coyote Creek Watershed below Anderson Reservoir flows 42 miles through the Cities of Milpitas, San Jose, and Morgan Hill and the unincorporated lands of Santa Clara Valley.

As part of the overall project to control flooding on Coyote Creek, the Water District completed construction of Reach 1 of Coyote Creek in 1989. Reach 2 was constructed by the Water District between 1990 and 1992, and full implementation of the mitigation program will be completed in 1993.

Flood control activity on Reach 1 includes construction of levees and retaining walls, and excavation of a bypass channel taking flood waters from Coyote Creek around the south side of Newby Island to Coyote Slough. The FR/EIS plan called for the relocation of Standish Dam from its existing location at the border of Reaches 1 and 2 to approximately 1,290 feet upstream to Reach 2. As a mitigation measure to increase freshwater habitat upstream of the dam for the steelhead and salmon summer rearing habitat, the dam was repositioned to a site near Dixon Landing Road in Reach 1.

In Reach 2, earth overflow channels were constructed parallel to the stream corridor. Earth levees were constructed adjacent to the banks of the overflow channel to provide 100-year flood carrying capacity with 3 feet of freeboard. Because of right-of-way constraints, the overflow channel was designed to cross the existing stream in three locations. The Alviso-Milpitas Road bridge was to be removed.

Flood control activities caused the loss of creek meander in Reach 1 and the conversion of a former salt pond to tidal habitat, with associated losses of marsh vegetation and the waterfowl and shorebird habitat associated with the salt pond. A Seasonal Wetland

Management Plan was developed to mitigate for the loss of marsh vegetation. This plan includes the creation of a mosaic of seasonal wetland area, channels and islands in the Delta Island area, and a 17-acre pond for waterfowl and shorebirds. Other mitigation measures include the management of a 55-acre to provide for the salt marsh harvest mouse.

According to the FR/EIS and FEIS, the Water District is currently studying remedial measures on Coyote Creek between Montague Expressway and Santa Clara Street (about 5 miles). Alternative measures include bypass channels, floodwalls, excavated channels and levees. At this time, it is not possible to predict which alternative design would be selected, if any. Following this study, Coyote Creek will be studied in phases upstream to Anderson Dam over the next ten years. Remedial measures are likely to include setback levees in the upper reaches and the raising of inadequate bridges. Overall, the impacts of improvements are expected to be low to moderate.

The City of San Jose plans to enlarge three bridges along Coyote Creek at Yerba Buena Road, Fontanosa Avenue and Tennant Avenue. The County also plans to enlarge Burnett Avenue bridge. Each project would remove small amounts of riparian woodland. Caltrans plans to remove about one acre of riparian habitat at the Highway 85 connection to South Valley Freeway and is planning to mitigate by planting three acres of riparian habitat.

The City of San Jose's Fisher Creek flood control project would require excavation of Coyote Creek between its confluence and Metcalf Road. Some riparian woodland would probably be removed. A mitigation plan would be devised.

Actions planned by the Water District and others would cumulatively result in impacts to wetland, riparian and aquatic environments. Even though these project may ' collectively cause major impacts, which in some cases are unavoidable, mitigation programs have been designed to offset the environmental damages.

(2) Other Projects within the Vicinity of Coyote Creek

Environmental studies prepared since 1985 for other projects near Coyote Creek have been reviewed to determine how their conclusions would have an effect on or are affected by the anticipated environmental impacts of the proposed Water District and Corps Coyote Creek projects addressed by this permit application. Two projects were found that could effect or be affected by the flood control project: the widening of SR 237 at the downstream end of Reach 3; and the construction of bridges over Coyote Creek in Reach 3 for the Tasman Drive project.

SR 237 Widening Project - The Final EIR/EIS was prepared jointly by Caltrans and the Federal Highway Administration in June of 1990 for the widening of SR 237 between Mathilda Avenue and I-880 (Caltrans, 1990). The proposed SR 237 freeway upgrade project would include the construction of additional bridges across Coyote Creek for access ramps. Caltrans assumed no impacts to the riparian corridor along Coyote Creek at SR 237 because the proposed flood control project would remove existing vegetation. The bridges would be built over a section proposed for concrete apron and, therefore, would not additionally impact riparian vegetation or proposed revegetation activities.

During construction of the bridge across Coyote Creek, however, spawning habitat and fish passage could be severely affected. To avoid and/or minimize the short-term impacts to biological resources, including fisheries, measures will be incorporated in the SR 237 freeway upgrade project plans, including implementing measures to minimize erosion and sedimentation, fencing off areas not directly affected by the project to avoid inadvertent encroachment, and restricting the construction period to avoid affecting fish migration between October 15 and May 15.

Tasman Drive Project - The Draft EIR/EA for the Tasman Drive/ I-880 Interchange and Tasman Drive/ Capitol Avenue Extension has been prepared jointly by Caltrans and the

Federal Highway Administration (Caltrans, 1991). The proposed Tasman Drive Project includes the construction of bridges over Coyote Creek that would result in the loss of approximately 0.5 acres of riparian vegetation under and immediately adjacent to the future bridge in Reach 3. In addition, the project would be crossing Coyote Creek at Revegetation Site 5, taking about 0.35 acre of the proposed revegetation area.

The proposed Tasman Drive Project will be responsible for finding a replacement location for the 0.35 acre of previously designated mitigation, in addition to mitigating for the direct impact of the 0.5 acre of riparian vegetation planned for removal. A mitigation ratio of 3.2:1 would be used to compensate for the loss of the 0.5 acre, for a total of 1.5 acres. A revegetation area equal to 1.5 acres plus the 0.35 acre of previously designated mitigation, therefore, would be required. According to the Draft EIR/EA, up to 2 acres of mitigation area would be revegetated somewhere within Water District's flood control Revegetation Sites 3 through 9, to be determined by the Water District.

According to the EIR/EA, planting would be designed to result in no net loss of acreage or habitat value. The planted vegetation at the site is expected to widen the Coyote Creek riparian corridor. The use of temporary above-ground irrigation system is proposed during the establishment period. Monitoring would be in accordance with the requirements of the USFWS and CDFG. The USFWS, CDFG, and Water District would be consulted in determining the final design plan and precise locations for these riparian mitigation plantings along Coyote Creek.

d. CONCLUSIONS AND RECOMMENDATIONS

Based on an analysis of the above identified impacts, a preliminary determination has been made that it will not be necessary to prepare a Supplemental Environmental Impact Statement (EIS) for the subject permit application. The Environmental Assessment of the proposed action has, however, not yet been finalized and this preliminary determination may be reconsidered if additional information is developed.

Citations:

Caltrans. ____ 1990. Final Environmental Impact Report and Environmental Impact Statement (EIR/EIS) for the State Highway 237 Freeway Upgrade Project. Caltrans and FHA, Sacramento, CA.

Caltrans. ____ 1991. Draft Environmental Impact Report/ Environmental Assessment (EIR/EA) for the Tasman Drive/I-880 Interchange and Tasman Drive/ Capitol Avenue Extension Project. Caltrans and FHA, Sacramento, CA.

Santa Clara Valley Water District (SCVWD). October 1984. Engineers Report and Final Environmental Impact Report (FEIR) for the Coyote Creek Planning Study, San Francisco Bay to Montague Expressway. SCVWD, San Jose, CA.

SCVWD. March 1989. Lower Coyote Creek Fisheries Report. Prepared by the Habitat Restoration Group (HRG) for the SCVWD, San Jose, CA.

U.S. Army Corps of Engineers, Sacramento District (Corps). January 1987. Final Environmental Impact Statement (FEIS) Coyote Creek Flood Control Proposal -- Santa Clara County, California. Corps, Sacramento, CA.

Corps. April 1988. Interim Feasibility Report and Final Environmental Impact Statement (FR/EIS) for Coyote Creek and Berryessa Creek, Santa Clara County, California. Corps, Sacramento, CA.

Corps. May 1993. Final Environmental Assessment (FEA) for Proposed Refinements to the Coyote Creek Element of the Coyote and Berryessa Creeks Project. Corps, Sacramento, CA.

5. Evaluation of this activity's impact on the public interest will also include application of the guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b) of the Clean Water Act, 33 U.S.C. Section 1344 (b).

6. The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed

activity and its intended use on the public interest. Evaluation of the probable impacts which the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments.

The decision whether to authorize a proposal, and if so the conditions under which it will be allowed to occur, are therefore determined by the outcome of the general balancing process. That decision will reflect the national concern for both protection and utilization of important resources. All factors which may be relevant to the proposal must be considered including the cumulative effects thereof. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and in general, the needs and welfare of the people.

7. The Corps of Engineers is soliciting comments from the public, Federal, State and local agencies and official, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

8. Interested parties may submit in writing any comments concerning this activity. Comments should include the applicant's name, the number, and the date of this notice and should be forwarded so as to reach this office within the comment period specified on page one of this notice. Comments should be sent to Lieutenant Colonel Leonard E. Cardoza, District Engineer, Attention: Regulatory Branch. It is Corps policy to forward any such comments which include objections to the applicant for resolution or rebuttal. Any person may also request, in writing, within the comment period of this notice that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Additional details may be obtained by contacting ____________ of our office (telephone 415-744-_____extension ___). Details on any changes of a minor nature which are made in the final permit action will be provided on request.

Section 1
Project Description

1.1 Introduction

The Coyote Creek Reach 3 project is designed to provide 100-year flood protection in the cities of San Jose and Milpitas, California, in conjunction with downstream flood control features previously permitted by the Corps and constructed by the Santa Clara Valley Water District (Water District). This work is described as Reaches 1 and 2, between San Francisco Bay and SR 237.

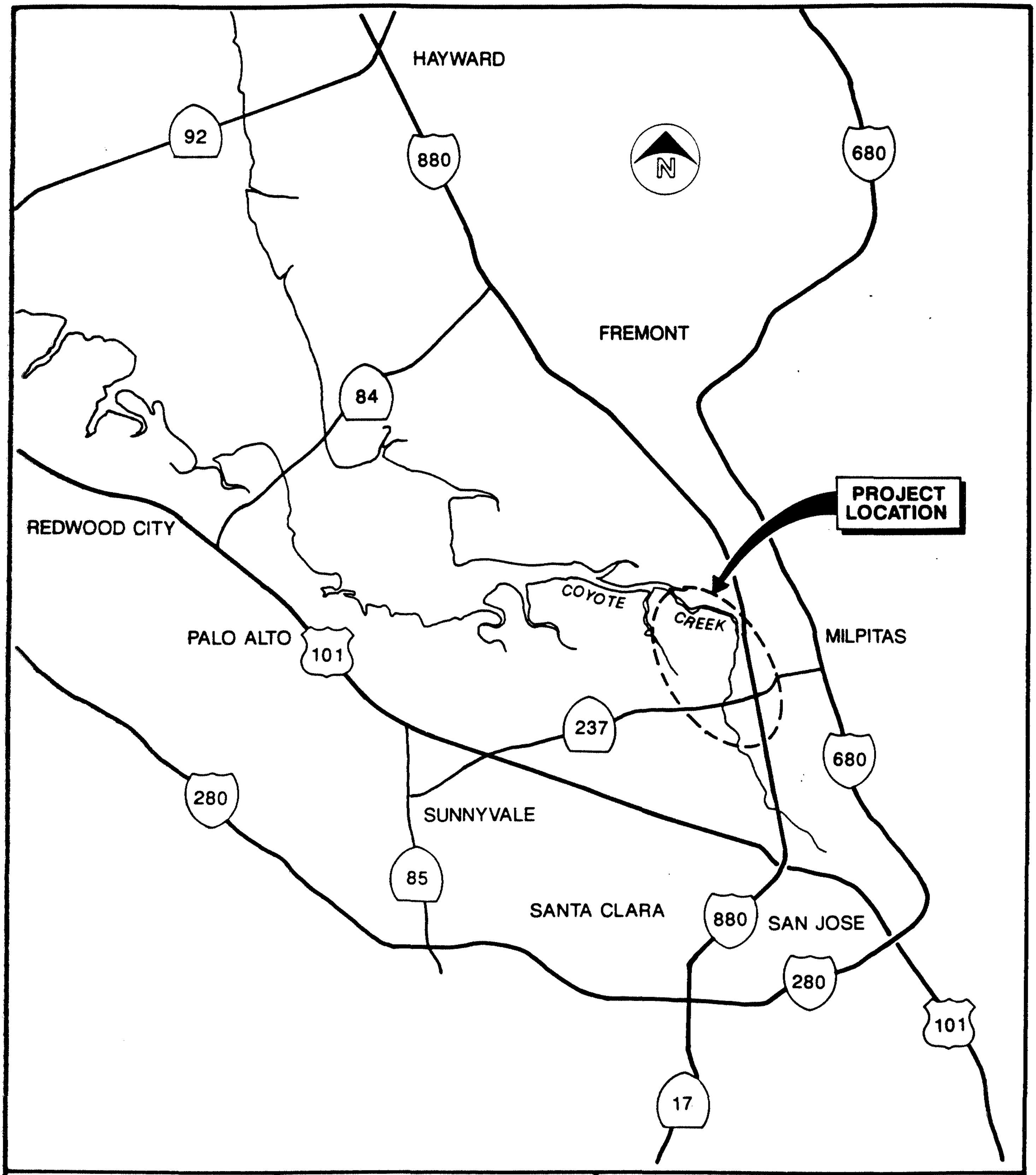
Coyote Creek originates in the Diablo Mountain Range along the eastern edge of the Santa Clara Valley, and flows in a northeasterly direction through the cities of Morgan Hill, San Jose, and Milpitas into the southern end of San Francisco Bay (Figure 1). Reach 3 of Coyote Creek extends from the downstream side of State Route 237 (SR 237) to the upstream side of the Montague Expressway Bridge, a distance of approximately 2.5 miles (Figure 2).

Reach 3 is divided into two portions designated as 3A and 3B. Reach 3A begins at the upstream end of SR 237 and extends upstream for approximately 1.1 miles from Station 577+00 to Station 634+00 (Figures 3, 4, and 5). Reach 3B extends approximately 1.2 miles further upstream to Montague Expressway from Station 634+00 to Station 696+00, and also includes approximately 0.2 miles downstream of SR 237 from Station 566+00 to Station 577+00 (Figures 3, 6, 7 and 8).

Reach 3 is the next phase in a program to provide flood protection along the seven-mile stretch of lower Coyote Creek in the northeastern portion of Santa Clara Valley. Construction of the flood control features in Reaches 1 and 2, from San Francisco Bay to SR 237, were completed between 1985 and 1992. All three reaches were evaluated in a Final Environmental Impact Statement (FEIS) issued by the US Army Corps of Engineers (Corps), San Francisco District, Regulatory Branch in 1987. Corps permits issued for Reaches 1 and 2 are Numbers 15962S49 and 15336S12, as amended and modified.

The lower Coyote Creek flood control program was authorized as a federal project under the Water Resources Development Act of 1988. In 1988, an Interim Feasibility Report and Environmental Impact Statement (FR/EIS) were prepared by the Sacramento District of the Corps for Reaches 1 through 3. Refinements to that plan were subsequently made and the refined plan is described in the Final Environmental Analysis, Proposed Refinements to the Coyote Creek Flood Control Project (FEA) which was recently issued in May 1993.

The Reach 3 project addressed in this application is the same as the Refined Authorized Project Plan in the FEA, with the exception that construction will be



PURPOSE:
COYOTE CREEK FLOOD
CONTROL IMPROVEMENT
PROJECT

DATUM: NGVD

FIGURE 1

REGIONAL AND VICINITY MAP

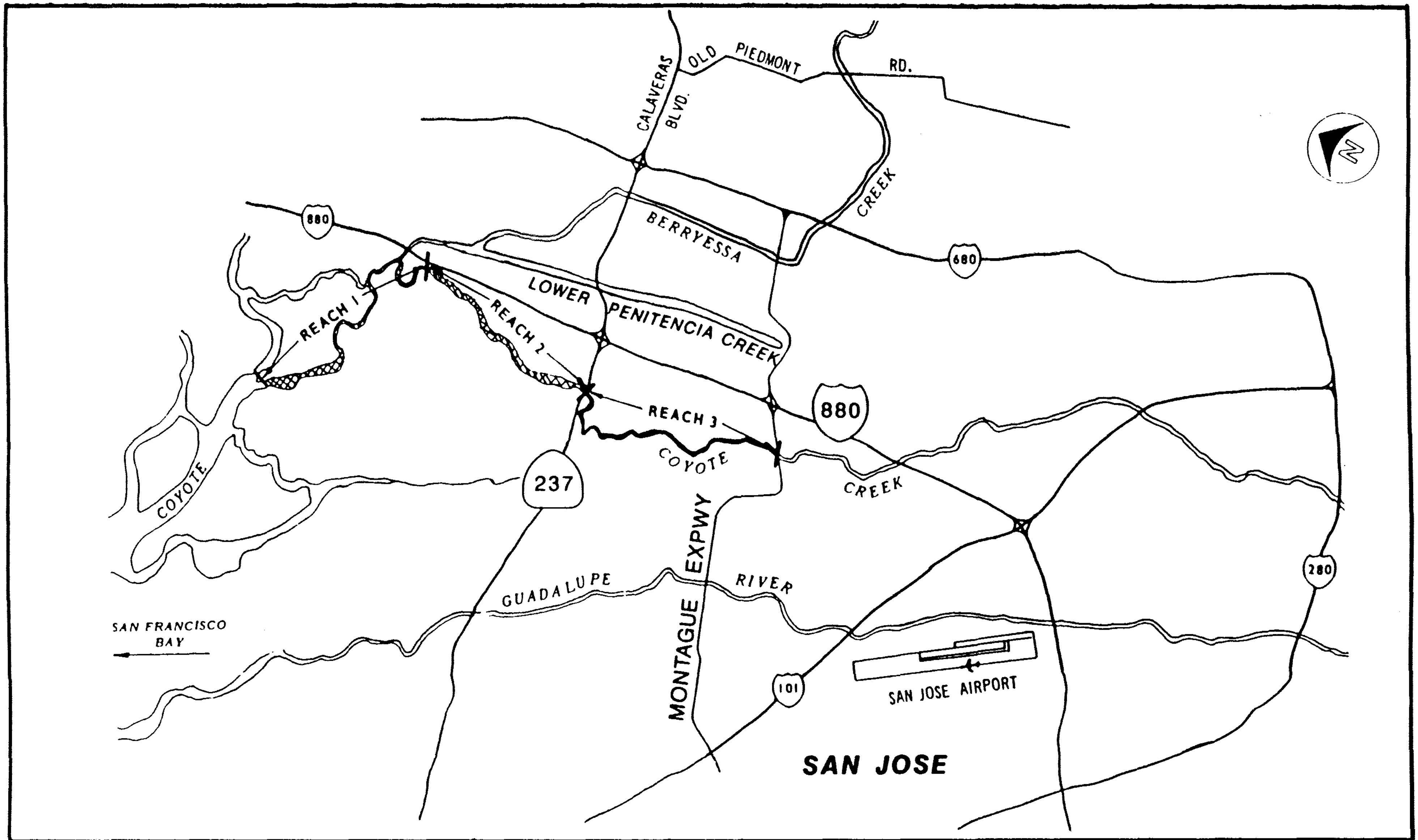
NO SCALE

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

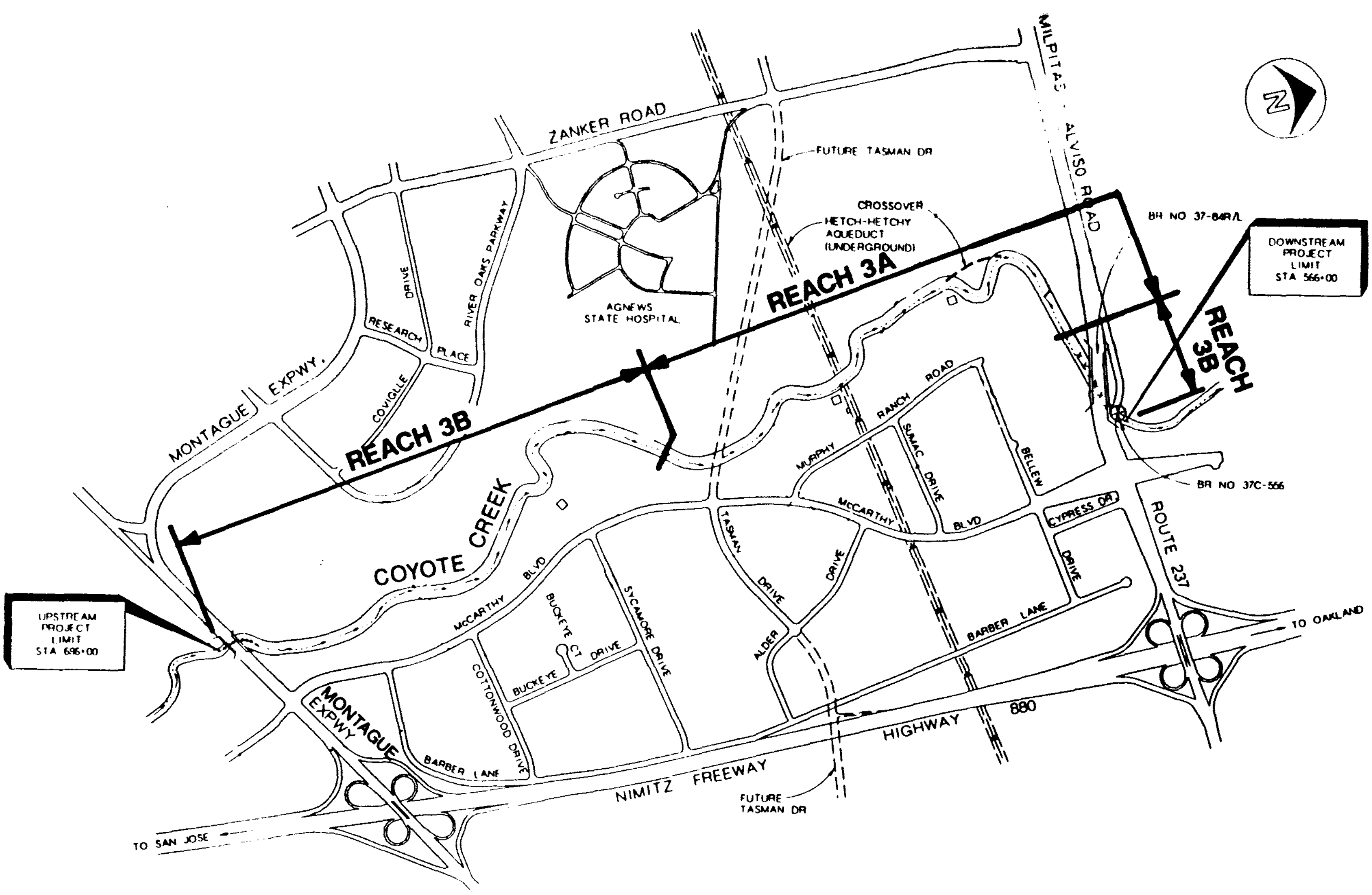
IN:CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF
DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT DATUM: NGVD	**FIGURE 2** **PROJECT LOCATION SHOWING REACHES 1, 2, & 3** 0 1 MILE	PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS IN: CITIES OF SAN JOSE & MILPITAS COUNTY OF SANTA CLARA, CALIFORNIA APPLICATION BY: SCVWD 5750 ALMADEN EXPWY SAN JOSE, CA 95118 SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE 3

LIMIT OF REACHES 3A AND 3B OF COYOTE CREEK

0 1800

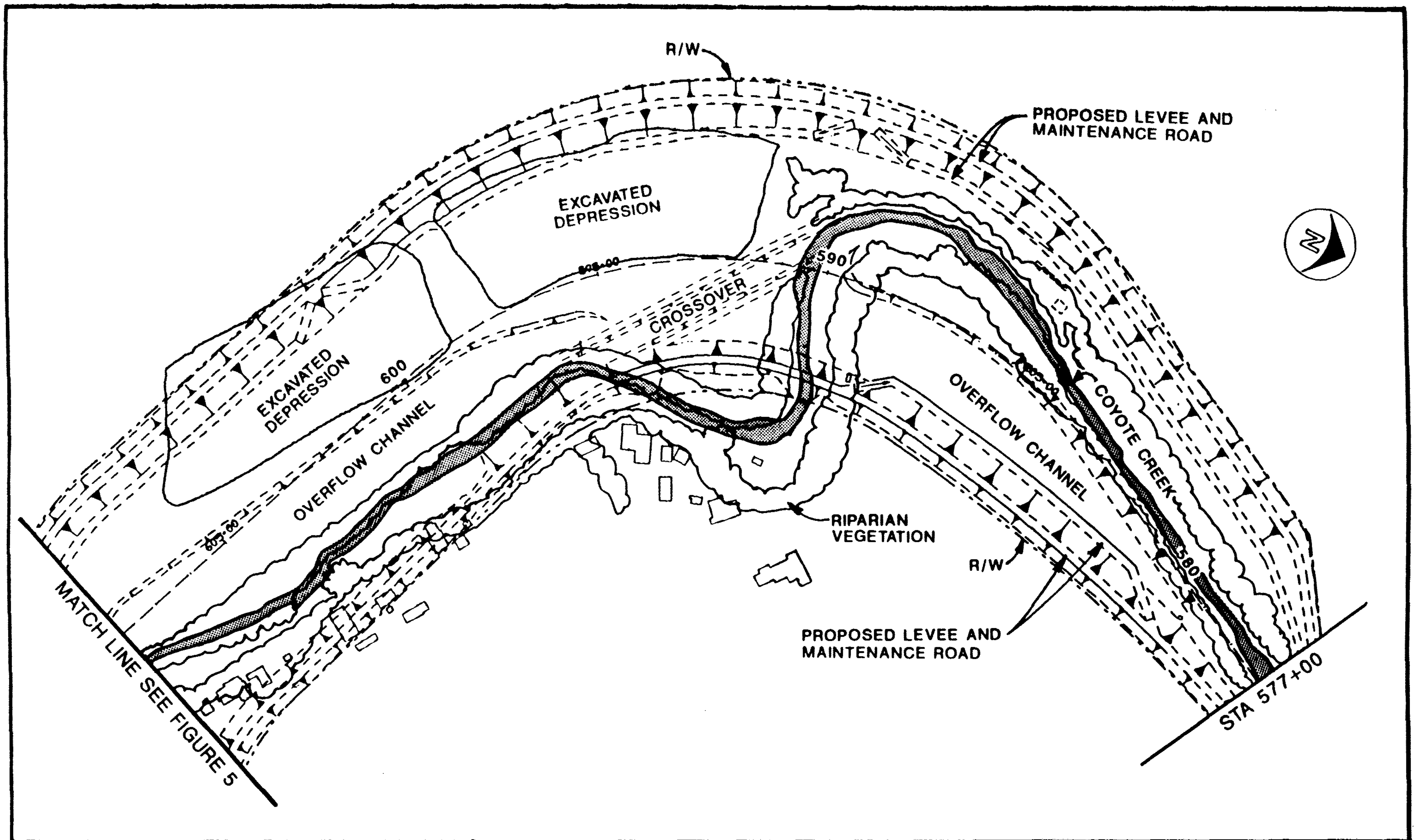
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD
CONTROL IMPROVEMENT PROJECT

LEGEND:
RIPARIAN VEGETATION
R/W RIGHT-OF-WAY
---- PROPOSED FEATURES

DATUM: NGVD

FIGURE 4

PROPOSED REACH 3A ACTIVITIES

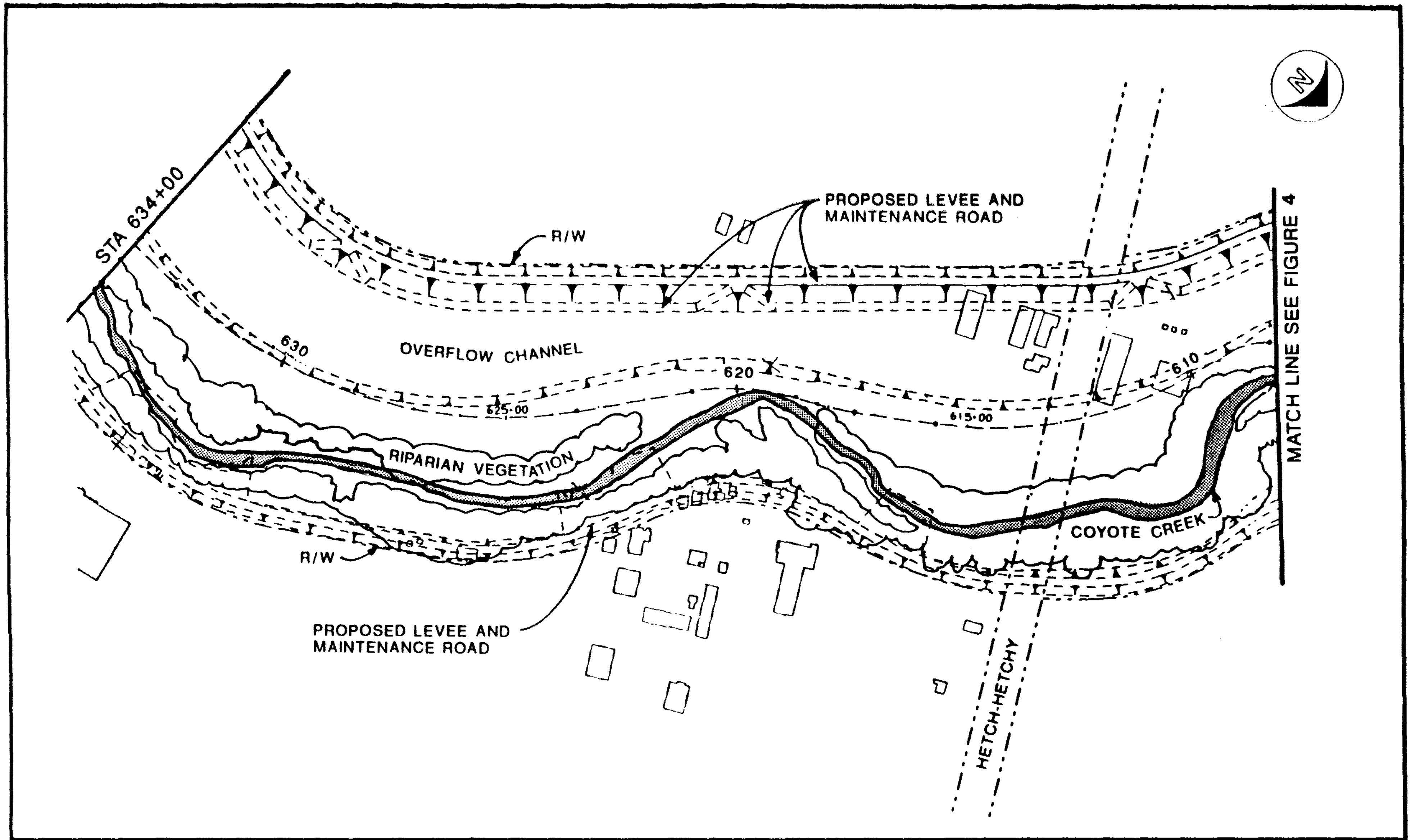
0 300
FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD
CONTROL IMPROVEMENT PROJECT

LEGEND:
RIPARIAN VEGETATION
R/W RIGHT-OF-WAY
---- PROPOSED FEATURES

DATUM: NGVD

FIGURE 5

PROPOSED REACH 3A ACTIVITIES

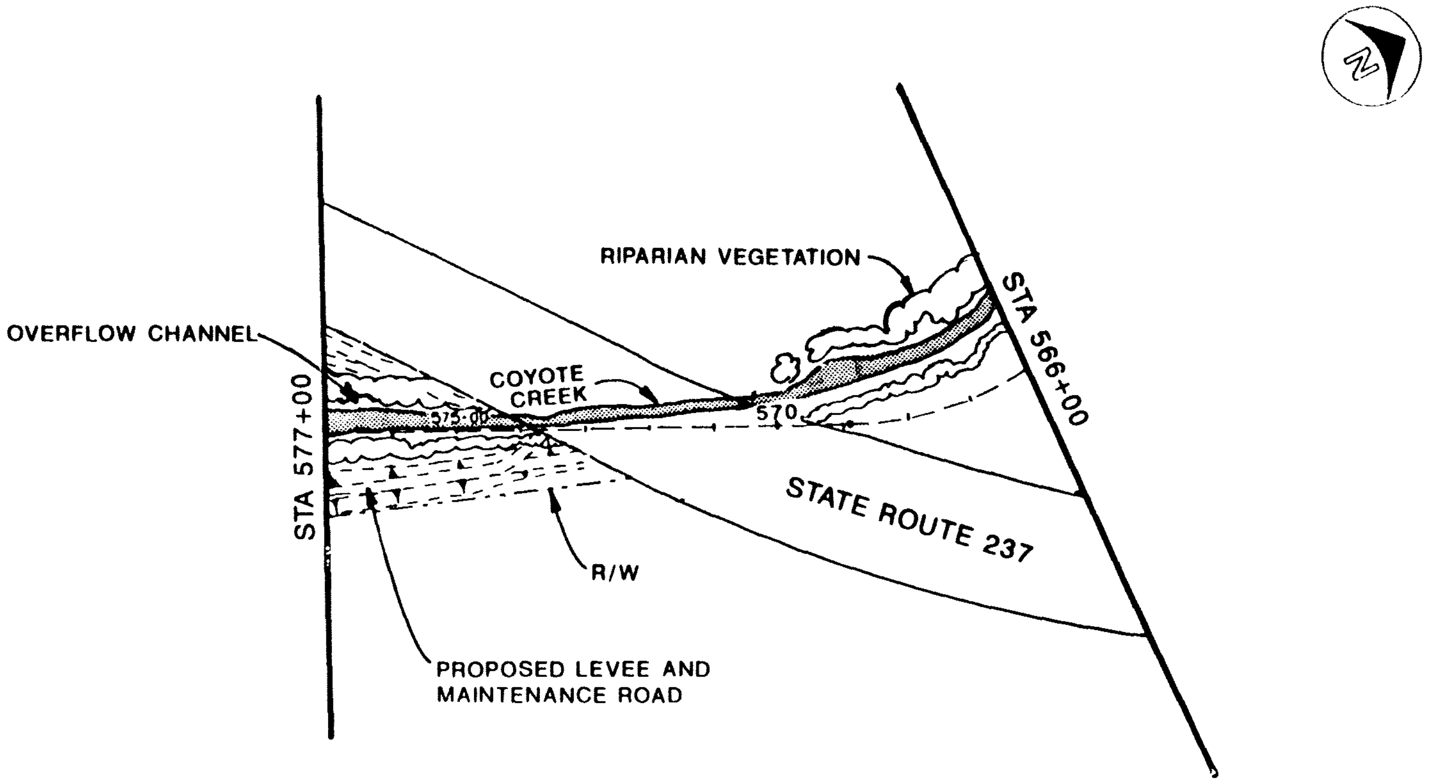
0 300
FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:
〰 RIPARIAN VEGETATION
R/W RIGHT-OF-WAY
---- PROPOSED FEATURES

DATUM: NGVD

FIGURE 6

PROPOSED REACH 3B ACTIVITIES

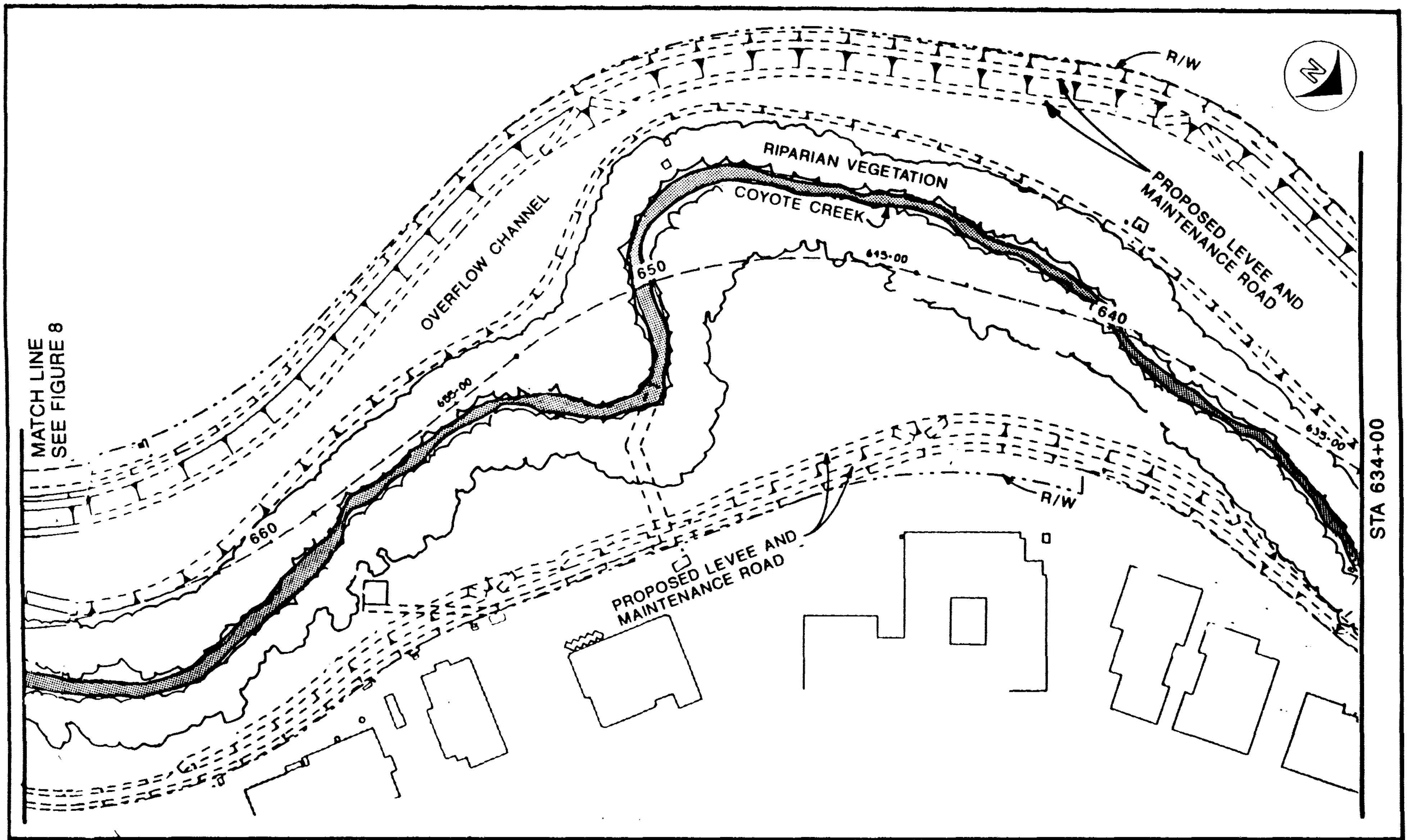
0 300
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

〰 RIPARIAN VEGETATION

R/W RIGHT-OF-WAY

---- PROPOSED FEATURES

DATUM: NGVD

FIGURE 7

PROPOSED REACH 3B ACTIVITIES

0 300

FEET

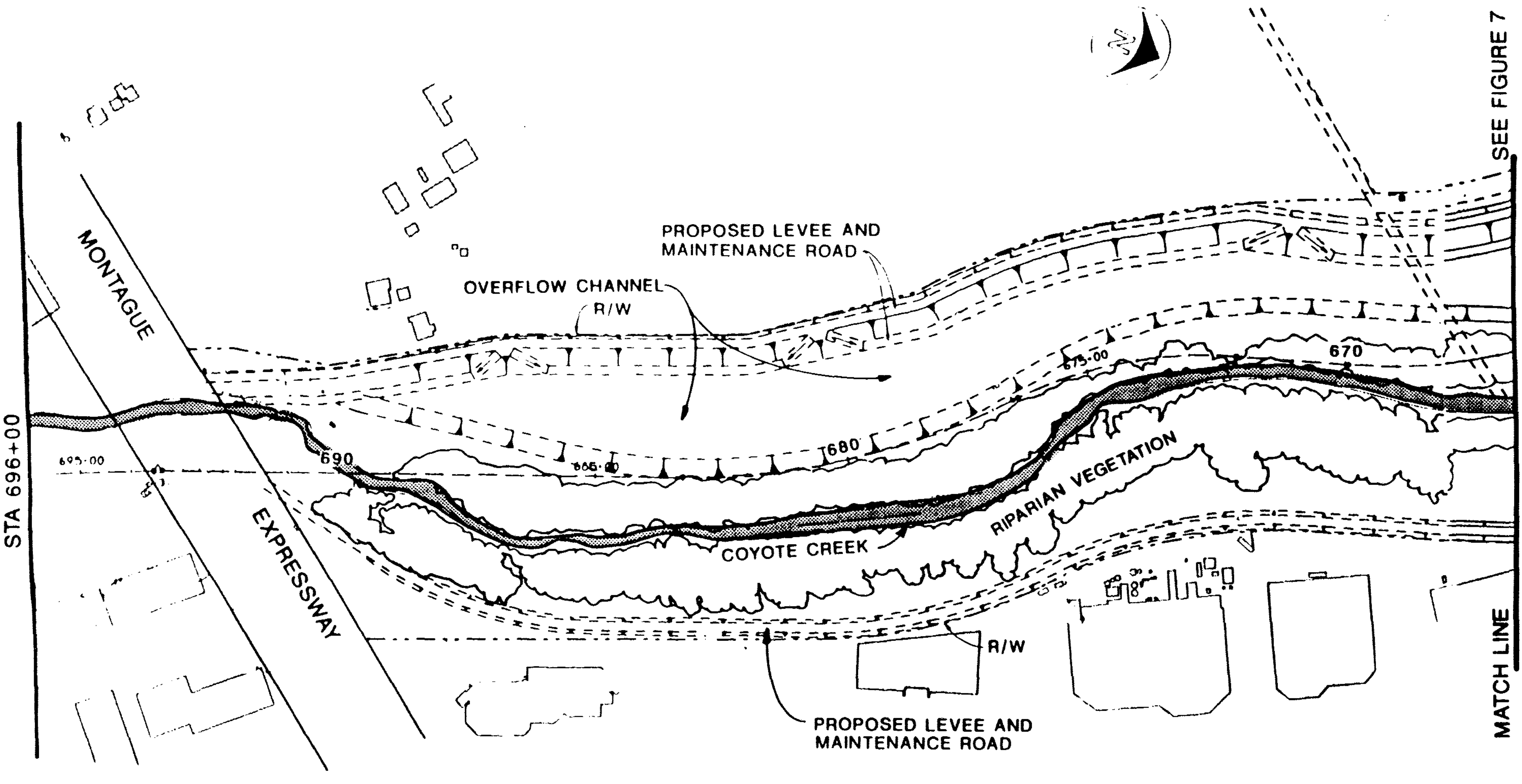
PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

〰 RIPARIAN VEGETATION
R/W RIGHT-OF-WAY
---- PROPOSED FEATURES

DATUM: NGVD

FIGURE 8

PROPOSED REACH 3B ACTIVITIES

0 300
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93

undertaken by the Water District under a Section 215 agreement, rather than by the federal government. Executive Summaries of the FR/EIS and FEA are included in Appendix A and can be referred to for more detailed descriptions of the proposed Reach 3 work and the previously constructed features in Reaches 1 and 2.

Since the flood control program was evaluated under the FEIS, some refinements have been made in the Reach 3 levee design and placement, and overflow channel slope and width. Also, additional mitigation measures have been incorporated to minimize impacts to wetlands, riparian vegetation, wildlife, fisheries and hazardous waste. These specific refinements have been evaluated for environmental impacts under the FEA and FR/EIS and are summarized below.

- The refined Coyote Creek project included modifications to the overflow channel depth and width that resulted in the reduction of the amount of impact to riparian vegetation. The project plan originally called for the existing west levee and its associated riparian vegetation to be removed and the bank to be rock-lined, about 5,000 feet upstream of SR 237, in Reach 3A. In the refined plan, the west-side overflow channel upstream of the realignment area (between Station 619+00 and 622+00) was designed with somewhat steeper slopes and cross-slopes, resulting in narrowing of the overflow channel from that originally proposed. As a result of the narrowing of the overflow channel in this area, the amount of riparian vegetation impact is reduced by 300 linear feet, and rock-lining in this area is no longer needed.

- In Reach 3B, a 900-foot floodwall was originally proposed to protect riparian vegetation along the west right-of-way between Stations 643+00 and 652+00. This floodwall has been replaced with a levee. Because of the narrowing of the overflow channel in this area, no effects to existing vegetation would occur.

- The east levee waterside slopes have been steepened in two areas to minimize impacts to riparian vegetation. Previously, the levee slopes between Stations 588+00 to 600+00 in Reach 3A, and Stations 662+00 to 690+00 in Reach 3B, had been designed at 3 horizontal on 1 vertical (3:1 slope). In the refined project plan, levee slopes in these two areas have been steepened to 2 horizontal on 1 vertical (2:1 slope).

- Some individual riparian revegetation sites proposed in Reach 3 have increased or decreased in size, however, the total area of 20.3 acres available for such revegetation in Reach 3 has not changed. The acreage of proposed riparian revegetation sites in Reach 3 under this application are provided in the Habitat Mitigation and Monitoring Program in Appendix C.

- Mitigation for the construction of levees through two excavated depressions with wetlands characteristics on the west side of Coyote Creek south of SR 237, in Reach 3A, has been incorporated into the overflow channel design. The status of these excavated depressions and their mitigation are further described under Sections 3.1 and 4.1 of this application.

- Several new mitigation measures regarding fisheries have been incorporated since a subsequent study, the Fisheries Evaluation Report (Stanley and Associates, et al., 1987), found evidence of steelhead and chinook salmon runs in Coyote Creek. These mitigation measures are further described under Section 4.1 of this application.

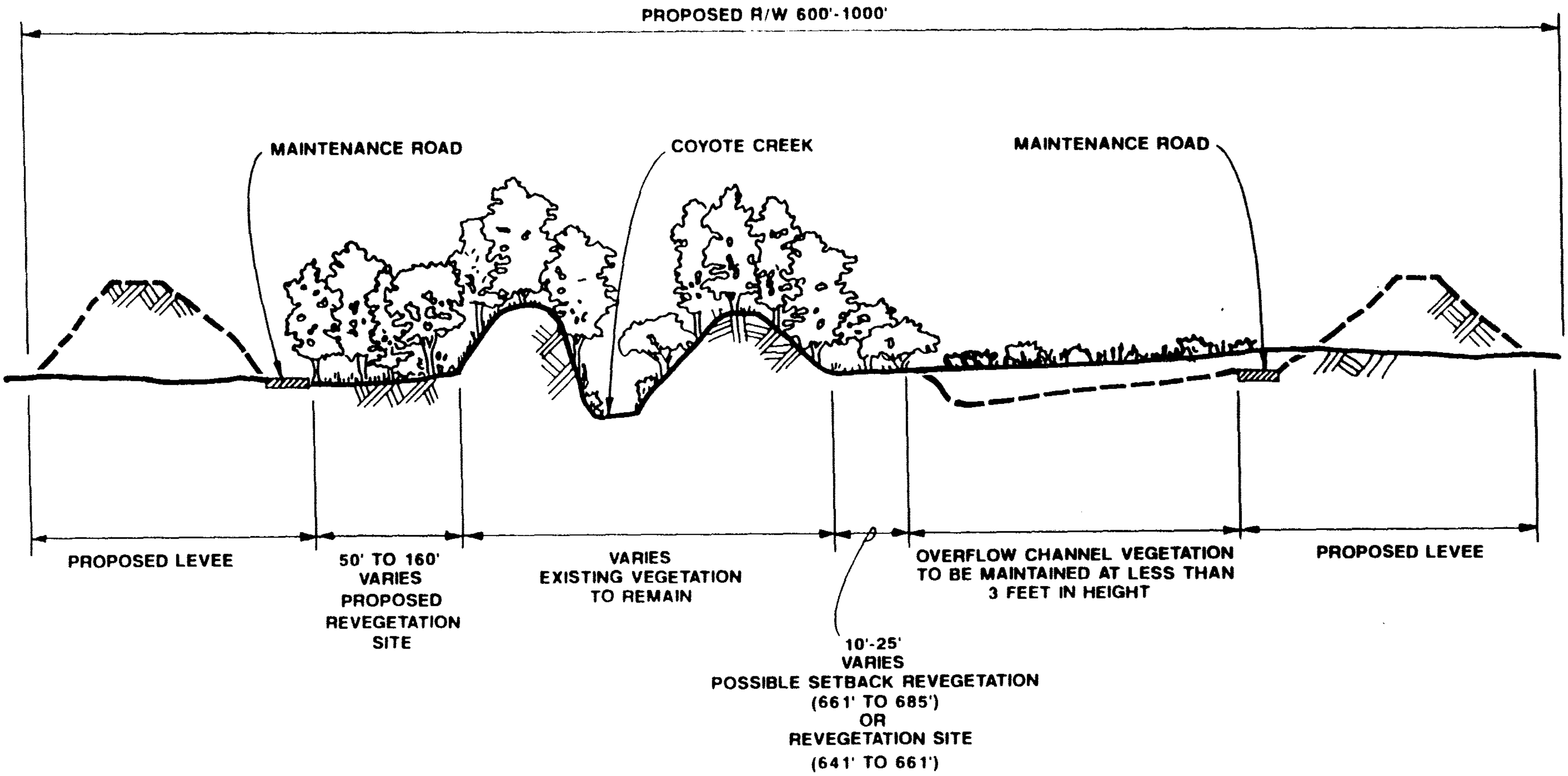
- Areas of Soils Contamination: Five areas of contamination were found in Reach 3 as a result of Water District investigations (FEA). Of these, two sites located in proposed revegetation sites in Reach 3A were determined to have contamination levels that could present a potential risk during grading and construction activities. Implementation of cleanup and disposal measures will adequately mitigate these potential impacts, and no further mitigation is necessary. These mitigation measures are further described in Section 4.2.4 of this application.

- A new prehistoric archaeological site (CA-SCl-675) has been discovered in Reaches 3A and 3B and has been determined as eligible for listing in the National Register of Historic Places. Consultations with the State Historic Preservation Officer have begun to determine appropriate mitigation and procedures during construction. This site and mitigation measures are further described under Section 4.2.3 of this application.

1.2 Proposed Project

Construction on Reach 3 will include offset levees outside the existing creek channel with an excavated overflow channel between the existing channel banks and the new offset levees (see Figure 9, Reach 3 Typical Section).

Levees will be constructed of compacted soil which will contain the 1 percent flood flows. Where possible, the levees will be set back from the existing creek in order to preserve the existing riparian vegetation. Levee heights will range from 2 feet to 16 feet. The landside or outside slopes will be constructed with a slope of 2:1 (1 vertical to 2 horizontal). The waterside or inside slopes will have a 3:1 slope (1 vertical to 3 horizontal), except in two locations (Stations 588+00 to 600+00, and 662+00 to 690+00) where the east levee will have a inside slope of 2:1. The levee crowns will be 18 feet wide and also serve as maintenance and patrol roads. Patrol roads also will be constructed along the inside toes of the levees as the width of the right-of-way permits.


PROPOSED R/W 600'-1000'
MAINTENANCE ROAD
COYOTE CREEK
MAINTENANCE ROAD
PROPOSED LEVEE
50' TO 160' VARIES PROPOSED REVEGETATION SITE
VARIES EXISTING VEGETATION TO REMAIN
OVERFLOW CHANNEL VEGETATION TO BE MAINTAINED AT LESS THAN 3 FEET IN HEIGHT
PROPOSED LEVEE
10'-25' VARIES POSSIBLE SETBACK REVEGETATION (661' TO 685') OR REVEGETATION SITE (641' TO 661')

PURPOSE: COYOTE CREEK FLOOD
CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

--- PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE 9

REACH 3 TYPICAL SECTION

NO SCALE

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93

The excavated overflow channel will generally be located parallel to the existing creek corridor. In Reach 3, the overflow channel will be primarily on the west side of the existing creek except for approximately 1000 feet upstream of SR 237 where the overflow channel will be on the east side of the creek (Stations 577+00 to 590+00).

The bottom of the overflow channel will be generally 5 feet above the existing Coyote Creek channel bottom with a 1 percent minimum cross slope toward the existing creek channel to allow low flows to be contained within the natural Coyote Creek channel and riparian corridor. The width of the overflow channel will be sized to meet geologic, right-of-way and hydraulic constraints. Side slopes for the overflow channel will be excavated at 3:1.

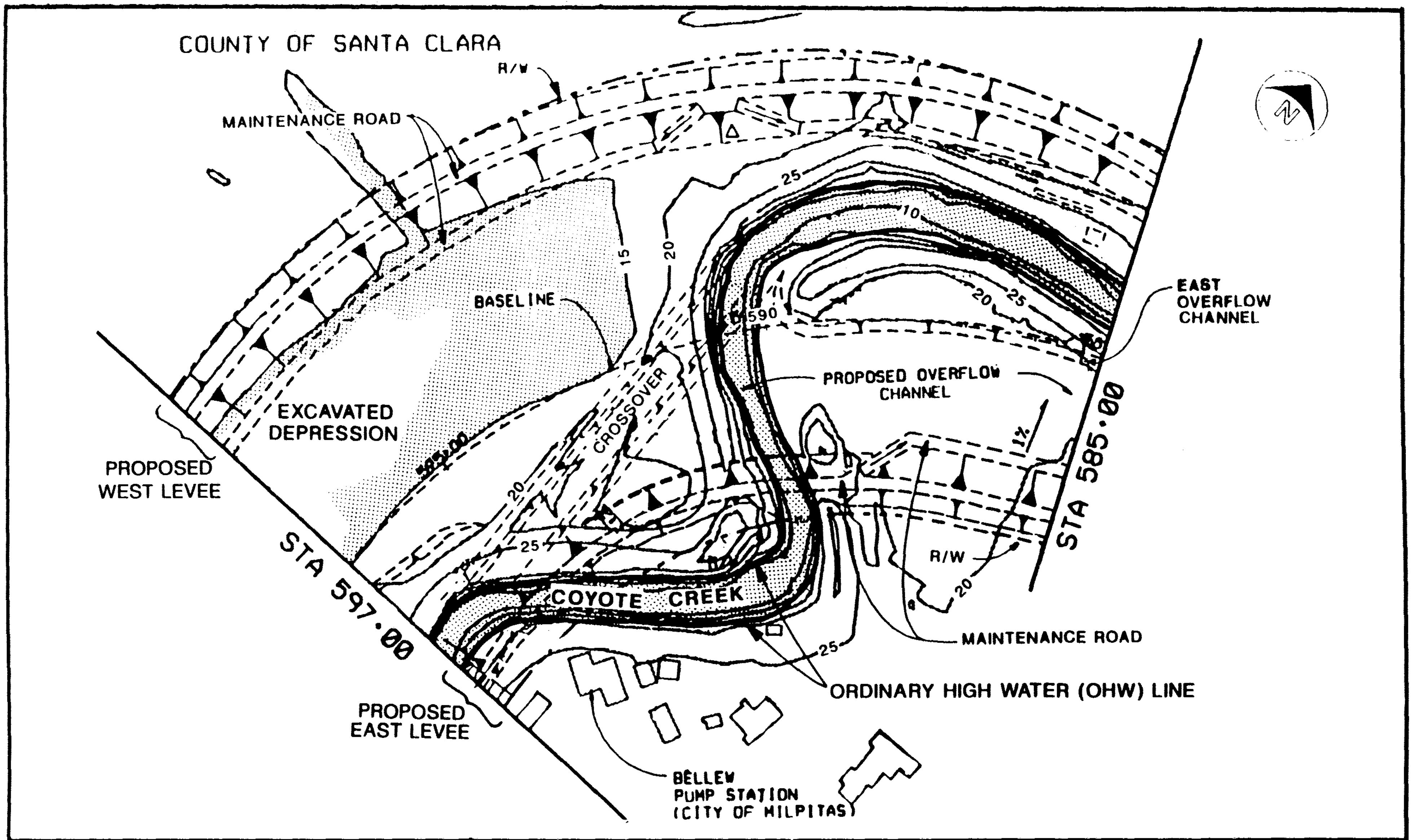
The location where the overflow channel crosses from one side of the creek channel to the other will be at a sharp bend in the existing creek in Reach 3A (see Figures 10 and 11). The existing creek levees will be removed and the creek lined with rock material. At the upstream and downstream ends of the channel lining, a 5-foot-deep rock cutoff wall will be constructed across the full width of the lined channel. The lined channel will consist of a low flow channel, a 15-foot wide benched section, and side slopes of 1-foot vertical on 3-feet horizontal. This crossover will be maintained free of woody vegetation to prevent obstruction of flood flows. Rock material will be sized to provide adequate protection from flood flows and provide cover and retreat areas for fish.

In Reach 3B, a concrete-lined trapezoidal channel with rock lining transitions will be constructed under SR 237 (Stations 566+00 to 579+00). A low-flow channel and baffles to facilitate fish passage will also be constructed under SR 237 between Stations 566+00 and 579+00 (see Figures 12 and 13).

In Reach 3B, rock lining will be placed under the Montague Expressway Bridge and in the transition on either side of the bridge between Stations 686+00 and 695+00 (see Figures 14 and 15). Existing levees will be removed and the channel banks lined with rock at points where the overflow channel crosses the existing creek channel.

After establishment of the riparian vegetation plantings, no significant long-term maintenance activities are expected to occur as a result of the project, with the exception of large downed-tree removal within the existing creek channel. Plantings within the overflow channel, considered upland area, are not to exceed three feet in height. Maintenance activities required to maintain the vegetation present in the overflow channel below this level are not anticipated to be significant. Crossover plantings will be comprised of a 15-foot strip located at the top of the bank behind areas of riprap. Plantings in this area are required to be less than three feet in height above the level of the overflow channel. Maintenance activities required to maintain this level are also not expected to be significant.

During construction activities in Reach 3A and 3B, it is anticipated that no additional impacts to riparian vegetation, wetlands, or proposed mitigation areas would occur. All staging and borrow area activities will occur only within the proposed overflow channel,



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

--- PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE 10

OVERFLOW CHANNEL AND CROSSOVER AREA PLAN VIEW

0 200

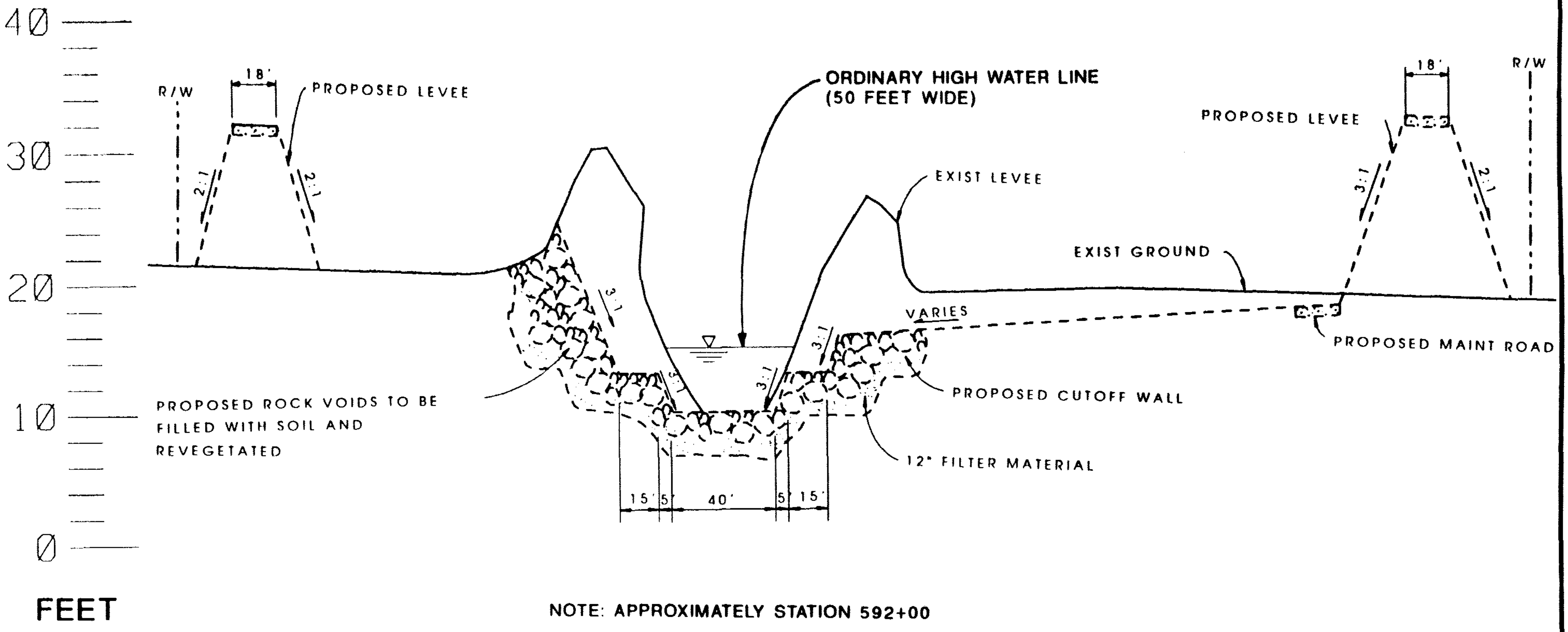
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



NOTE: APPROXIMATELY STATION 592+00

FOR PLAN VIEW
SEE FIGURE 10

PURPOSE: COYOTE CREEK FLOOD
CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

--- PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE 11

OVERFLOW CHANNEL AND CROSSOVER AREA CROSS SECTION

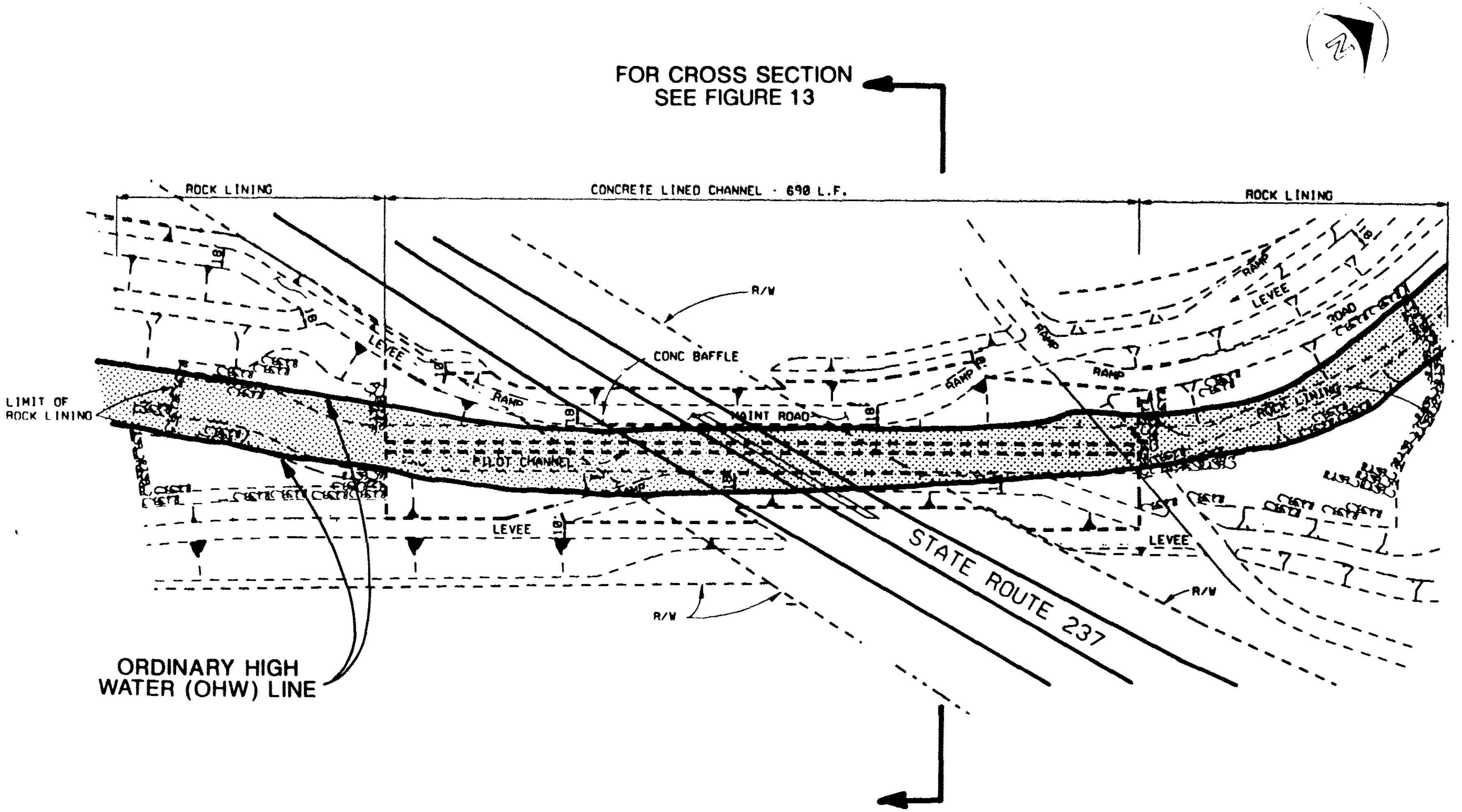
SCALE: HORIZONTAL 1"=60'
VERTICAL 1"=12'

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD
CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

--- PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE 12

FISH PASSAGE CREEK
MODIFICATIONS UNDER SR237
PLAN VIEW

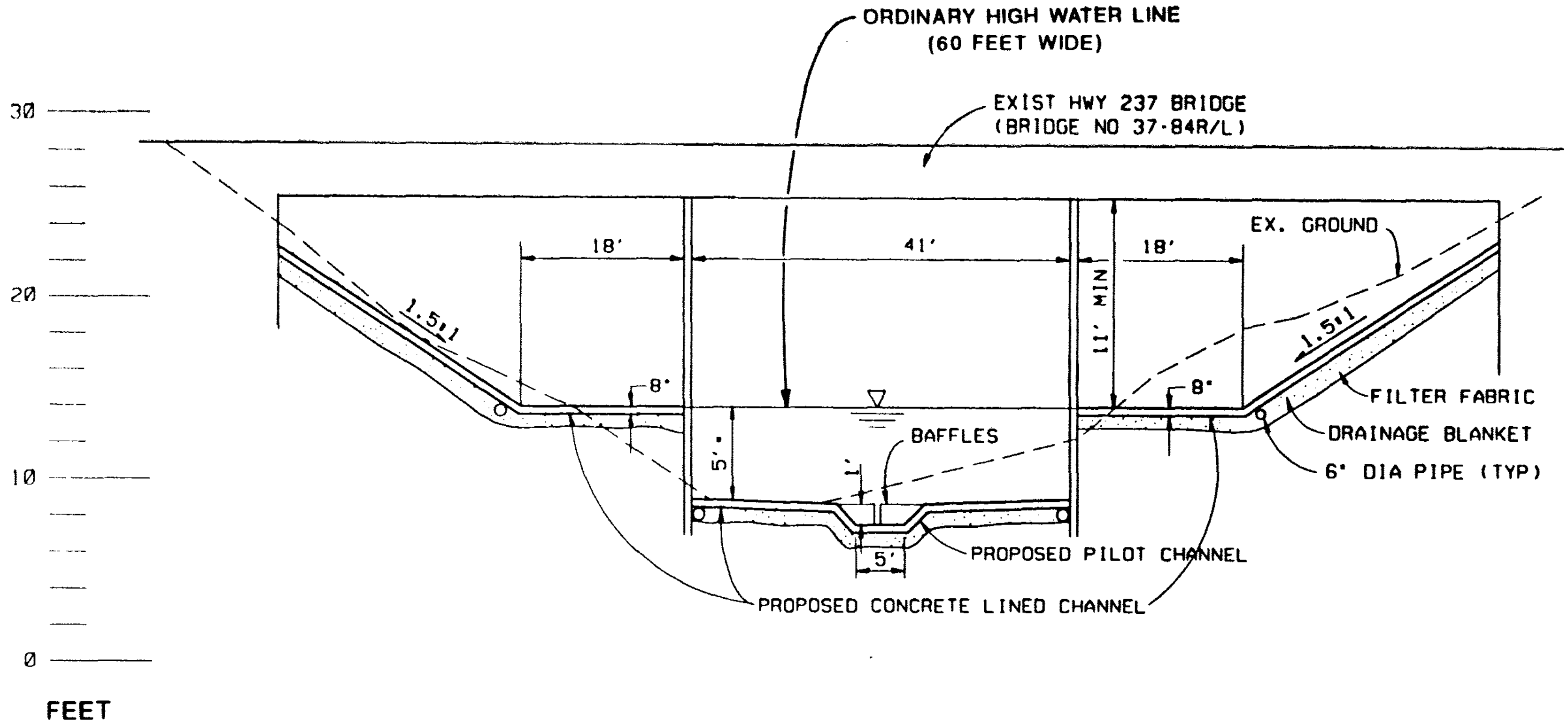
0 150
FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

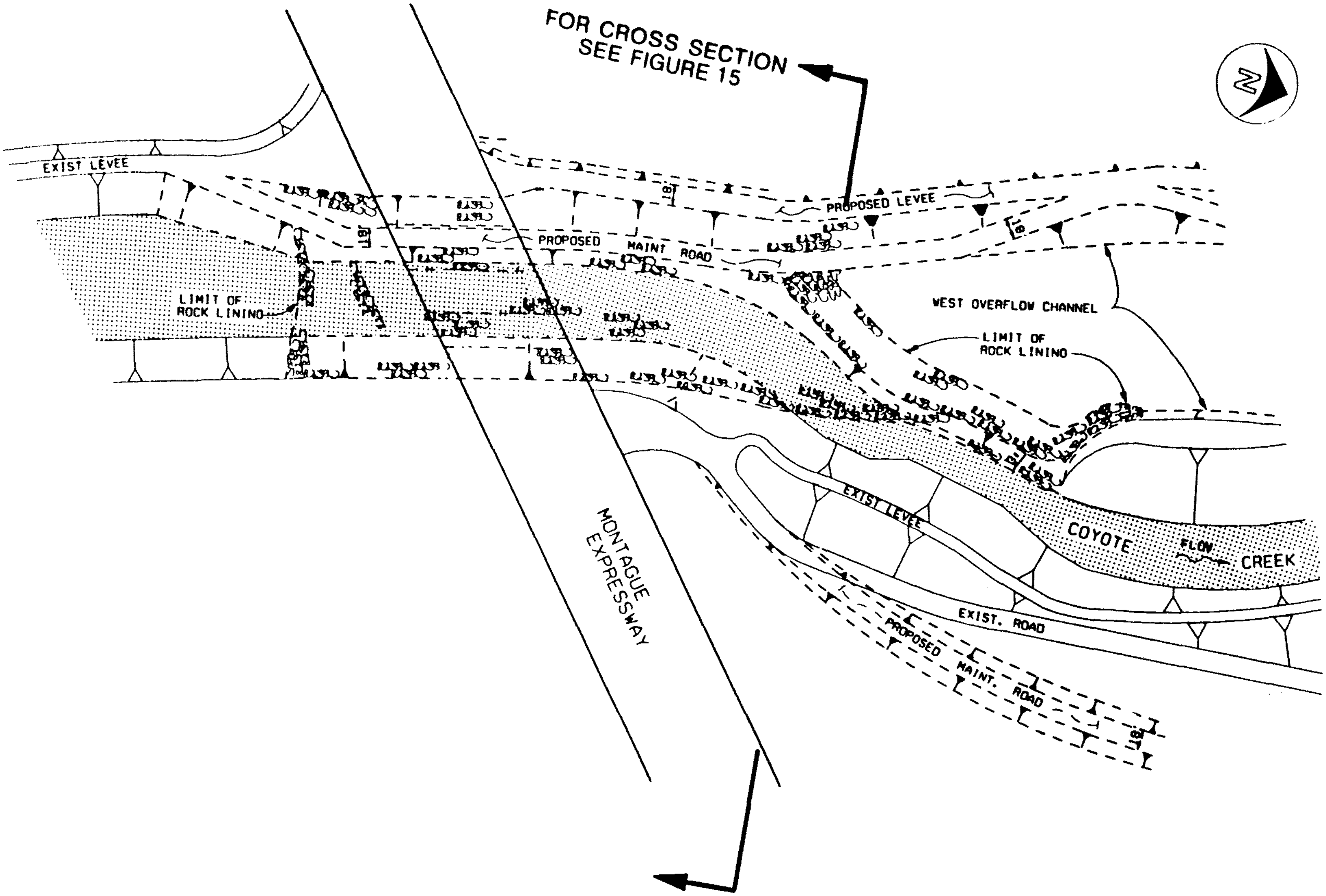
APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



FOR PLAN VIEW SEE FIGURE 12

PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT DATUM: NGVD	**FIGURE 13** **FISH PASSAGE CREEK MODIFICATIONS UNDER SR237 CROSS SECTION** SCALE: HORIZONTAL 1"=20' VERTICAL 1"=10'	PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS IN: CITIES OF SAN JOSE & MILPITAS COUNTY OF SANTA CLARA, CALIFORNIA APPLICATION BY: SCVWD 5750 ALMADEN EXPWY SAN JOSE, CA 95118 SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE 14

ROCK-LINED AREA AT MONTAGUE EXPRESSWAY BRIDGE PLAN VIEW

0 300

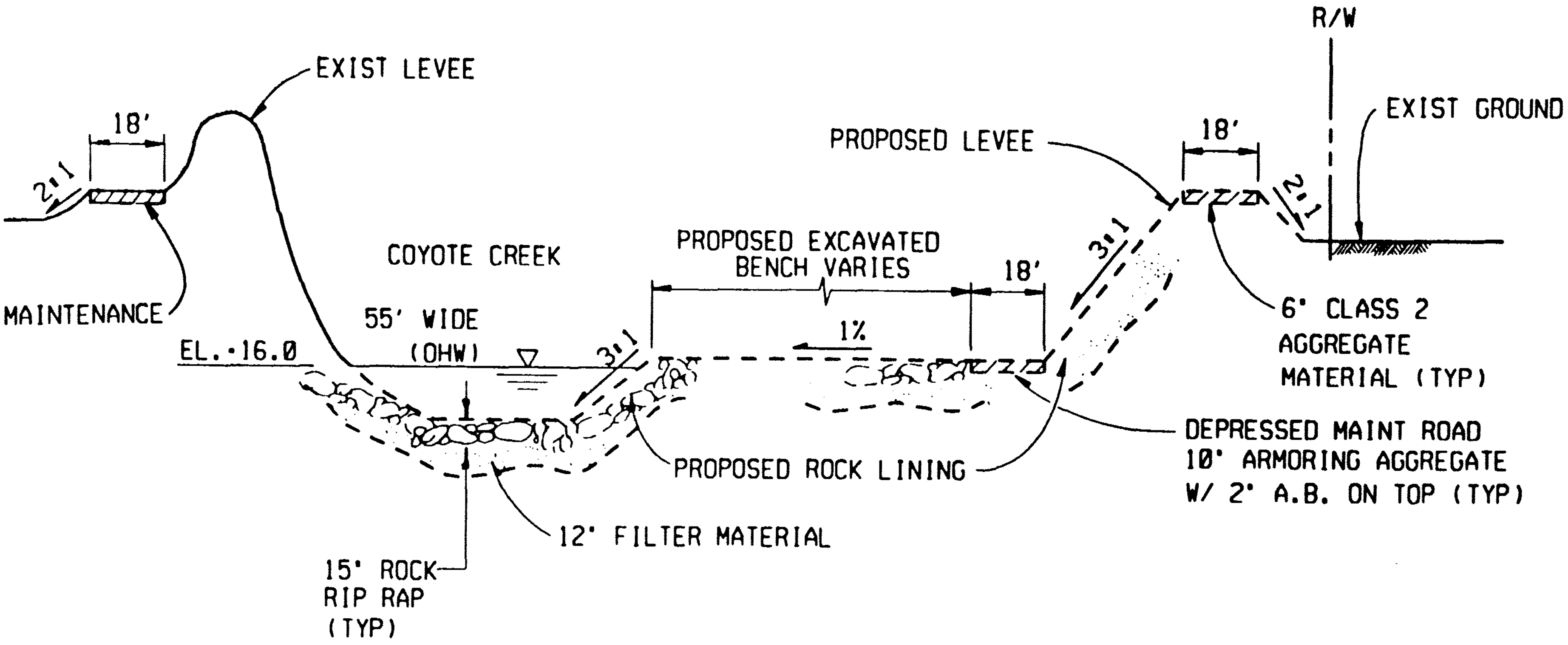
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



FOR PLAN VIEW SEE FIGURE 14

PURPOSE: COYOTE CREEK FLOOD
CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE 15

ROCK-LINED AREA AT MONTAGUE EXPRESSWAY BRIDGE CROSS SECTION

FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93

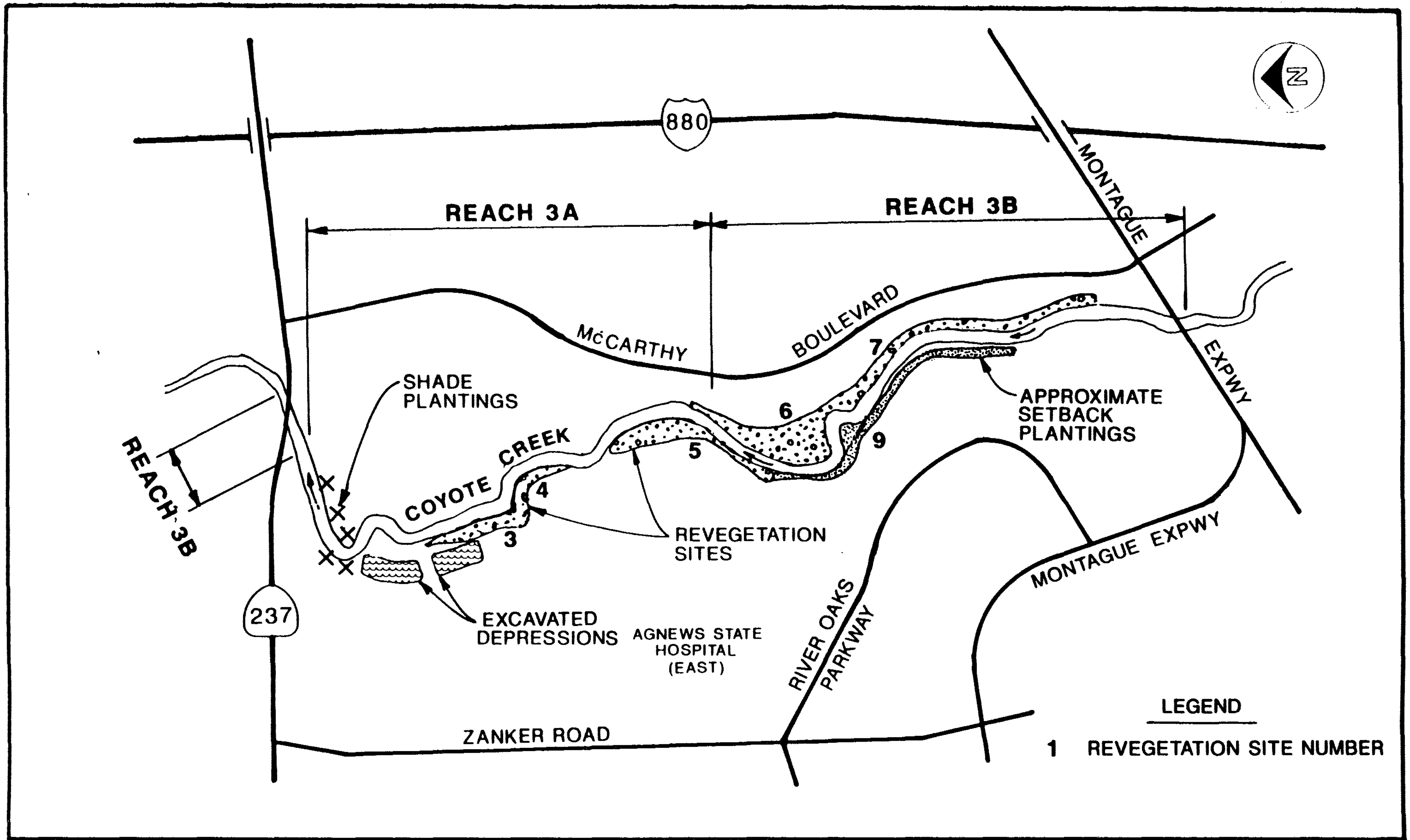
within the proposed levee footprint, or in areas of existing levee roadways. All access by roadway during construction is anticipated to be contained to existing levee roads.

Excavation for the proposed channel improvements includes approximately 350,000 cubic yards of strippings and alluvial fill materials (clay, sandy clay, clayey sands, and sands and gravels). All excavated material is considered excess and will be disposed of at a site owned by the Santa Clara County Transportation Agency. This site is located adjacent to and west of Coyote Creek, south of SR 237. A portion of the property on which the disposal site is located was acquired by the local project sponsor, for the Coyote Creek channel. As a condition of acquisition, the local sponsor agreed to place excess excavated material from the creek project on that portion of the property not acquired for the Coyote Creek project. Portions of this property may qualify as jurisdictional wetlands. Final placement of fill will be determined at the time the location of jurisdictional wetlands is verified by the Corps.

An extensive riparian revegetation program and wetland mitigation program is included to replace vegetation lost as a result of flood control facilities construction; this mitigation was developed as a result of a Habitat Evaluation Procedure (HEP) Analysis performed by the United States Fish and Wildlife Service (USFWS) for Reaches 2 and 3 (see FEIS). In Reach 3, 20.3 acres will be revegetated with middle and upper terrace riparian vegetation as described in detail in the Habitat Mitigation and Monitoring Program attached (Appendix C). In addition to these 20.3 acres of riparian revegetation, plantings are planned in setback areas, in the crossover area (where the overflow channel crosses over the existing channel), and in fishery shade mitigation sites (see Figure 16 for a map of the mitigation sites).

1.3 Purpose of and Need for the Project

The Coyote Creek Reach 3 project is designed to provide 100-year flood protection on Coyote Creek. Flooding on Coyote Creek within the project area has been a recurring problem since the early 1900's. Severe flooding from overtopping the creek banks occurred most recently during the winters of 1982 and 1983, when many public and private facilities were damaged by inundation. In the winter of 1982, flood waters damaged approximately 800 acres and inundated an estimated 260 homes and 60 businesses. In early January 1983, flood waters inundated approximately 4,000 acres and damaged about 360 homes and 40 businesses.



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE 16

PROPOSED RIPARIAN REVEGETATION MITIGATION AREA

0 1600
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93

Section 2
Section 404(B)1 Alternatives Analysis

The U.S. Army Corps of Engineers defined 13 alternative plans for the Coyote Creek project in evaluating flood control options in the 1987 FR/EIS. Six of these 13 alternatives were structural designs, one of which was ultimately selected as the recommended plan. Table 2-1 summarizes these 13 alternatives and notes the principal reasons given for selecting or rejecting each alternative. Appendix A, Environmental Reports, provides more detail regarding individual project alternatives.

As required by the National Environmental Policy Act (NEPA), the Corps defined the "no action" alternative to describe existing conditions within the project area, including existing flood control structures and practices, and used that alternative to establish a base line for assessing impacts. This alternative was rejected as the recommended plan for failing to provide adequate protection from flood damage. The Corps then defined six nonstructural alternatives, all of which were rejected because they were not economically justifiable and/or because they would not provide adequate flood protection. Following the nonstructural alternatives, four structural alternatives were considered, including an impoundment plan, a diversion plan, and two channel modification plans. Both the impoundment and diversion plans were rejected for being infeasible. Of the two separate channel modification plans, including the "Baylands Setback Levee Plan" and the "Lower Coyote Creek Levee and One Side Widening Plan," only the lower Coyote Creek Levee plan was determined to be economically justifiable.

Upon identifying the Lower Coyote Creek Levee plan as the justifiable alternative, this plan was reformulated in the FR/EIS into three separate alternatives in order to decrease construction costs and adverse environmental impacts. The three refined alternative plans, all of which basically employ offset levees and earthen overflow channels in different configurations, were then evaluated further considering planning, economic, and environmental factors. Based on this additional review, the Corps determined that all three would meet the planning objectives of providing adequate flood control, minimizing construction costs, and providing recreational amenities. Of the three alternatives, the "Alternate Sides" plan was identified as the recommended plan because it would incur the least construction costs and provide the greatest net economic benefits. All three alternatives included mitigation measures to compensate for the loss of riparian vegetation and fish and wildlife habitat.

Table 2-1
Alternatives to the Coyote Creek Project Considered by the 1987 FR/EIS

Plan Alternative	Description	Action
1. No Action	No federal or local flood control project implemented; existing nonstructural and structural flood controls would remain.	Rejected for failing to provide adequate protection from flood damage.
Nonstructural Alternatives		
2. Flood Insurance	Federal Emergency Management Agency provides subsidized flood insurance within the 100-year flood plain.	Already implemented; considered as part of the future no-action condition.
3. Flood Forecast, Warning, & Evacuation	Public system created to facilitate advanced warning and evacuation.	Partially implemented at local level but rejected as recommended plan for failing to provide adequate protection to property.
4. Removal of Existing Structures	Private land purchased by public agency and property removed.	Rejected for being economically infeasible and too disruptive to the existing community.
5. Combination Floodproofing	Existing structures within the 100-year floodplain floodproofed through construction of a flood wall and the raising and/or relocation of selected structures.	Rejected for being economically infeasible.
6. Protect Moveable, Damageable Property	Flood damage reduction limited to property that can be moved or rearranged.	Rejected for failing to provide adequate protection to property.
7. Ring Levee (around Alviso)	12-foot ring levee constructed within 100-year floodplain around Alviso.	Rejected for failing to protect portions of floodplain outside of Alviso.
Structural Alternatives		
8. Impoundments	Existing reservoirs used for offstream floodwater storage and/or new offstream impoundments constructed.	Rejected because existing reservoirs are used for water supply and are not left empty (i.e., no capacity to reduce flood peak flows); new impoundments would be economically infeasible.

Table 2-1
Alternatives to the Coyote Creek Project Considered by the 1987 FR/EIS

Plan Alternative	Description	Action
9. Diversions	Concrete lined channel constructed between Coyote Creek to Canoas Creek (leading to the Guadalupe River).	Rejected because of potential for increased flooding on the Guadalupe flood plain.
Channel Modifications		
10. Baylands Setback Levee	Offset levees constructed 600 feet apart along Coyote Creek.	Rejected for being economically unjustified.
Lower Coyote Creek Levee & One Side Widening		
11. Alternate Sides Overflow Channel & Offset Levee	An overflow channel constructed on one side of the creek to accommodate floodwaters with a levee constructed on the opposite side to contain flows. The overflow channel would cross from the west side to the east side of the creek in one location.	RECOMMENDED PLAN - Meets all objectives at least cost and greatest net economic benefits.
12. Same Side Overflow Channel & Offset Levee	Same as Alternative 11, but the overflow channel would remain on the west side of the creek and levees/ floodwalls would be constructed on either side as necessary.	Rejected because of expense and lower net economic benefits.
13. Combination Overflow Channel & Offset Levee	This alternative represents a combination of Alternatives 11 and 12.	Rejected because of expense and lower net economic benefits.

Section 3

Description of Corps Jurisdictional Areas

Section 3.1 Waters and Wetlands

A delineation of jurisdictional wetlands and waters was conducted along Reach 3 of Coyote Creek proposed right-of-way, between the SR 237 bridge crossing and the Montague Expressway bridge crossing. Within the 2.5-mile long project area, 21.3 acres of jurisdictional waters and wetlands have been identified.

Two areas were identified within Reach 3 that are within the Corps' jurisdiction:

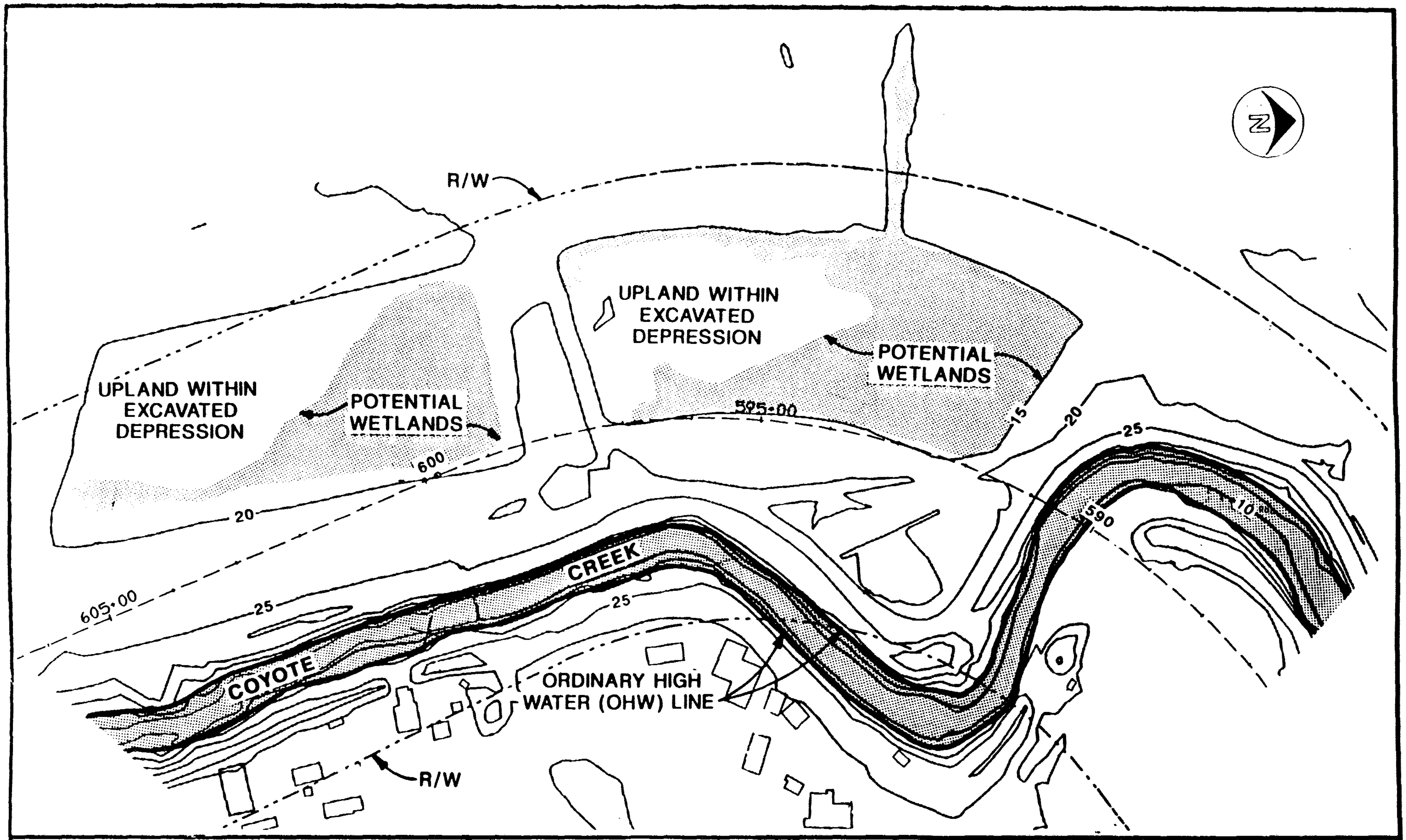
1. areas inside the banks of Coyote Creek that are within the limit of Ordinary High Water (OHW) (Reaches 3A and 3B) and

2. portions of 2 excavated depressions outside the existing west levee near SR 237 (Reach 3A).

In Reach 3A, about 7.4 acres of wetlands and waters occur within Coyote Creek; and about 4.0 acres of wetlands are found within the excavated depressions. In Reach 3B, about 9.9 acres of waters and wetlands are found within Coyote Creek.

Within Reach 3A, the proposed crossover structure would replace approximately 900 linear feet of meandering creek channel with 630 linear feet of a straightened channel. Also within Reach 3A, approximately 300 feet of channel would be lined with rock near the SR 237 bridge. This corresponds to a direct loss of approximately 1.4 acres of jurisdictional total area for Reach 3A in Coyote Creek, up to 0.4 acres of which are wetlands. Also within Reach 3A, proposed construction of a new levee would directly fill up to 0.5 acres of wetlands within the two excavated depressions (see Figures 17 and 18). Excavation of the adjacent overflow channel would cause approximately 0.2 acres of one depression to be excavated deeper, and could indirectly affect an additional 1.2 acres by altering the local hydrology.

Proposed construction activities within Reach 3B would impact approximately 2.1 acres of jurisdictional wetlands and waters near the Montague and SR 237 bridges (see Figures 19 and 20). About 0.7 acres of this area is considered to be wetlands. Jurisdictional areas in Reach 3A and 3B are described below. For a more detailed description of the vegetation, soils, and hydrology of these areas, refer to the Jurisdictional Waters and Wetland Report, Appendix B.


R/W
UPLAND WITHIN EXCAVATED DEPRESSION
POTENTIAL WETLANDS
UPLAND WITHIN EXCAVATED DEPRESSION
POTENTIAL WETLANDS
595+00
600
20
605+00
25
CREEK
COYOTE
25
ORDINARY HIGH WATER (OHW) LINE
R/W
15
20
25
590
10
N

PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT-OF-WAY

▨ JURISDICTIONAL WATERS

DATUM: NGVD

FIGURE 17

LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT THE CROSSOVER AREA

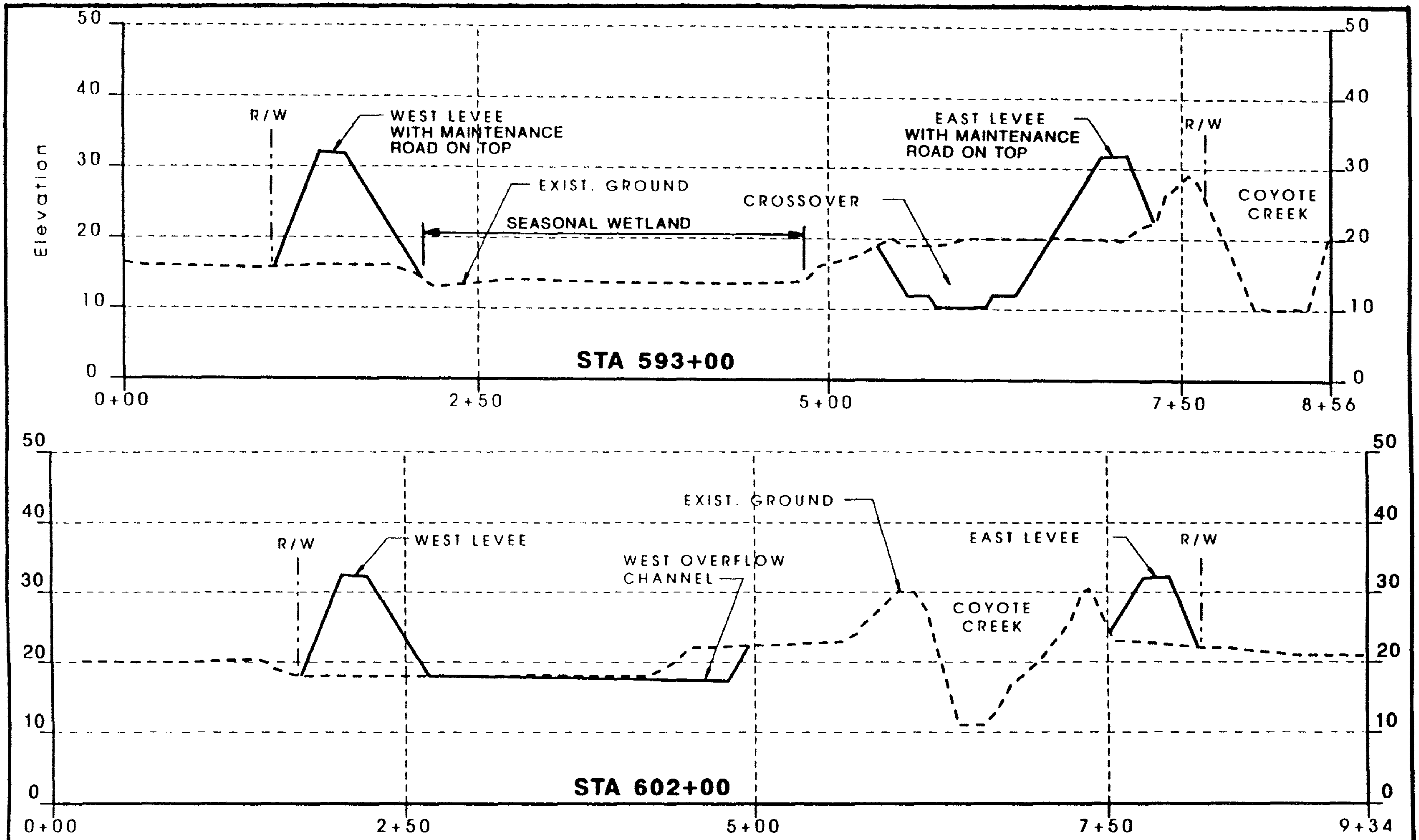
0 200
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND

R/W RIGHT-OF-WAY

- - - - PROPOSED FEATURE

DATUM: NGVD

FIGURE 18

TYPICAL SECTIONAL OF THE SEASONAL WETLAND AREA

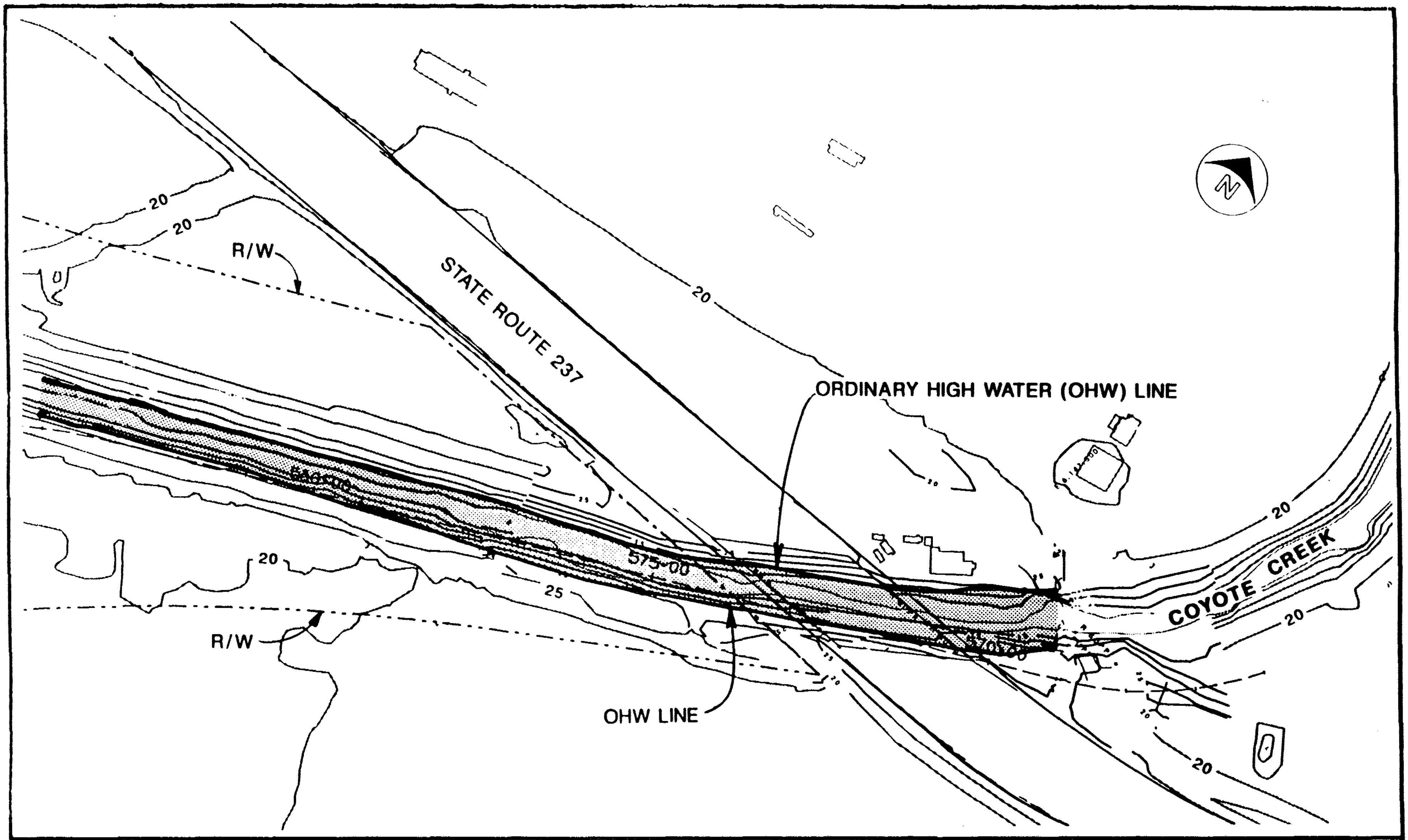
SCALE: HORIZONTAL 1"=100'
VERTICAL 1"=20'

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

— — — PROPOSED IMPROVEMENTS

▨ JURISDICTIONAL WATERS

DATUM: NGVD

FIGURE 19

LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT SR 237

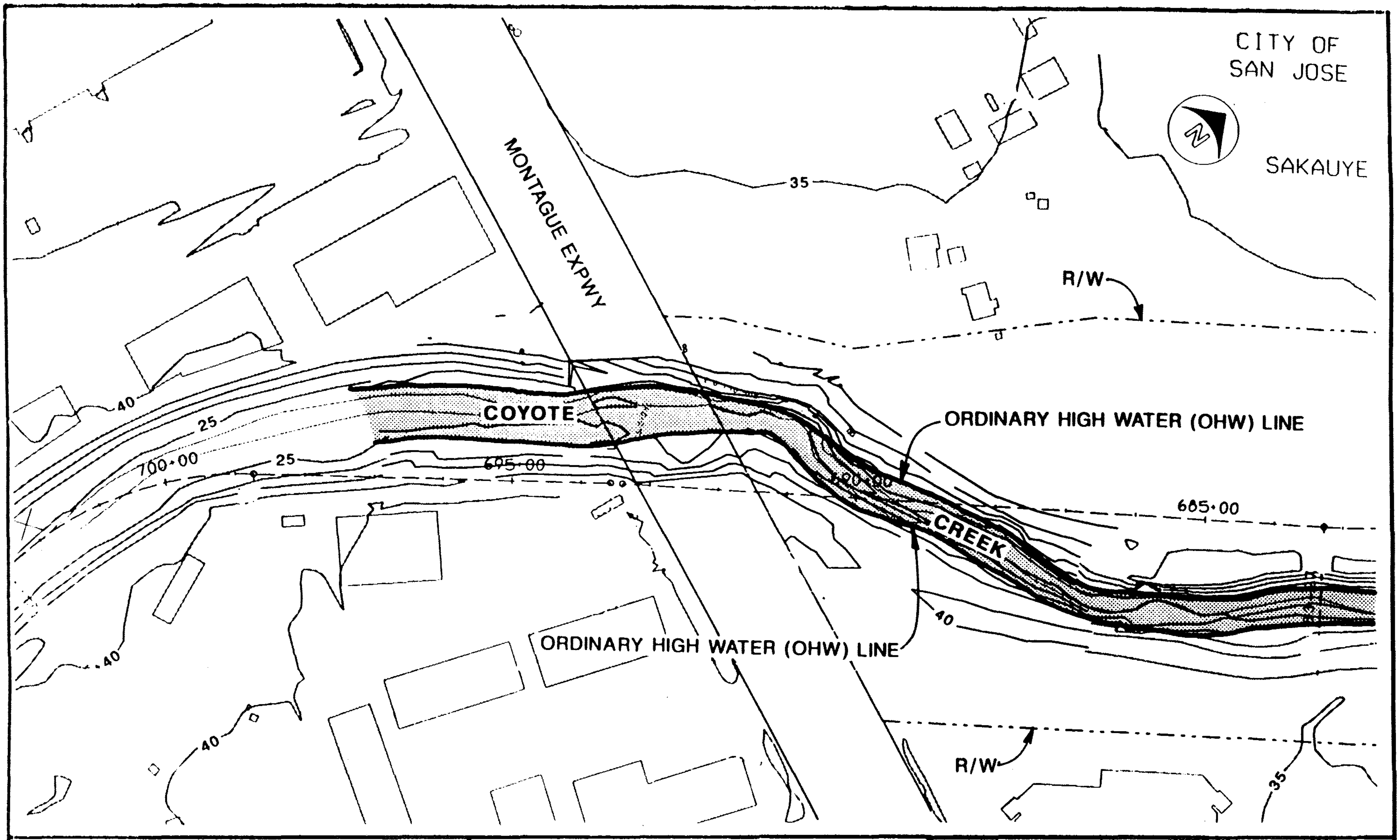
0 200
FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

--- PROPOSED IMPROVEMENTS

▨ JURISDICTIONAL WATERS

DATUM: NGVD

FIGURE 20

LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT MONTAGUE EXPRESSWAY

0 200
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93

3.1.1 Wetlands within the Coyote Creek corridor

In Reach 3, wetlands occur between the open flowing water of the creek and the upper portions of the existing levees. Gravel and sand bars within the creek provide substrate for emergent marsh vegetation and other wetland plants that grow above the low flow channel. Within Reach 3A, approximately 7.4 acres of jurisdictional area were delineated between the existing levee banks of Coyote Creek. The project would result in the filling of 1.4 acres of jurisdictional area within the Coyote Creek channel, of which 0.4 acres are wetlands.

Within Reach 3B, approximately 9.9 acres of jurisdictional area were identified. The jurisdictional area affected in Reach 3B is about 2.1 acres, with about 0.7 acres of this total fulfilling the wetlands criteria.

The vegetation community within the Coyote Creek corridor has been characterized in detail in past environmental analyses; the creek supports one of the most extensive mature riparian forest in the San Jose area. For most of the creek, mature cottonwood (*Populus fremontii*) and sycamore (*Platanus racemosa*) form a canopy over shrub and herbaceous strata. Shrubs, such as blackberry (*Rubus ursinus*), and smaller trees (e.g., willows, box elder) grow from near the base of the levee slopes to the top of the existing levees. Herbaceous species growing close to the active water channel include spreading bentgrass (*Agrostis stolonifera*), dotted smartweed (*Polygonum punctatum*), fragrant goldenrod (*Euthamia occidentalis*) and a few cattails (*Typha* spp.). In intermediate elevations (mid-way up the levee from the creek), mugwort (*Artemisia douglasiana*) and rough cockleburr (*Xanthium strumarium*) were prevalent.

The limit of jurisdictional waters was determined to be the elevation of the OHW line, calculated as the 2.3-year probability discharge of 1,500 cubic feet per second (see Figures 10, 12, and 14). No adjacent wetlands were identified within the levees that extended beyond the limit of OHW.

3.1.2 Wetlands within the Excavated Depressions

The two excavated depressions include both upland and wetland areas. Figure 17 shows the extent of the potential jurisdictional areas as preliminarily identified by Rob Lawrence and Dan Martel of the Corps. These areas were also determined to be wetlands, although at the time of the survey, the coverage of hydrophytic vegetation within the northernmost excavated depression was sparse. Vegetation in the northernmost depression was all herbaceous, including the marsh timothy (*Phalaris* sp.) and russian thistle (*Salsola kali*). In the southern depression, herbaceous species included seaside heliotrope (*Heliotropium curassavicum*) and rabbitsfoot grass (*Polypogon monspeliensis)*, with a few willows (*Salix* sp.) growing to form patches of a shrub vegetation layer.

The total acreage of jurisdictional wetlands within these ponds is about 4 acres; up to 0.5 acres of these depressions would be removed during construction of the new levees. Excavation of the adjacent overflow channel would cause approximately 0.2 acres of one depression to be excavated deeper, and could indirectly affect an additional 1.2 acres by altering the local hydrology.

3.2 Other Special Aquatic Sites (riffles, spawning gravels)

As described in the FR/EIS and FEA, Reach 3 is inhabited by freshwater fish species, including anadromous species. The fathead minnow and the red shiner are most abundant in Reach 3. A Fisheries Evaluation Report (HRG 1989) led to the discovery of evidence of salmon spawning sites (i.e., redds, or nests) in Reach 3 (see Figure 21, Spawning Redds and Potential Spawning Sites for Reaches 3A and 3B). Adult chinook salmon have been observed in the creek within the city of San Jose in subsequent years (Dr. Jerry Smith, 1993, personal communication). While steelhead have been known to use Coyote Creek and its upstream tributaries as spawning and rearing habitat for many years, the fisheries evaluation study also determined that they utilize the creek reaches as rearing habitat and potentially for spawning as well.

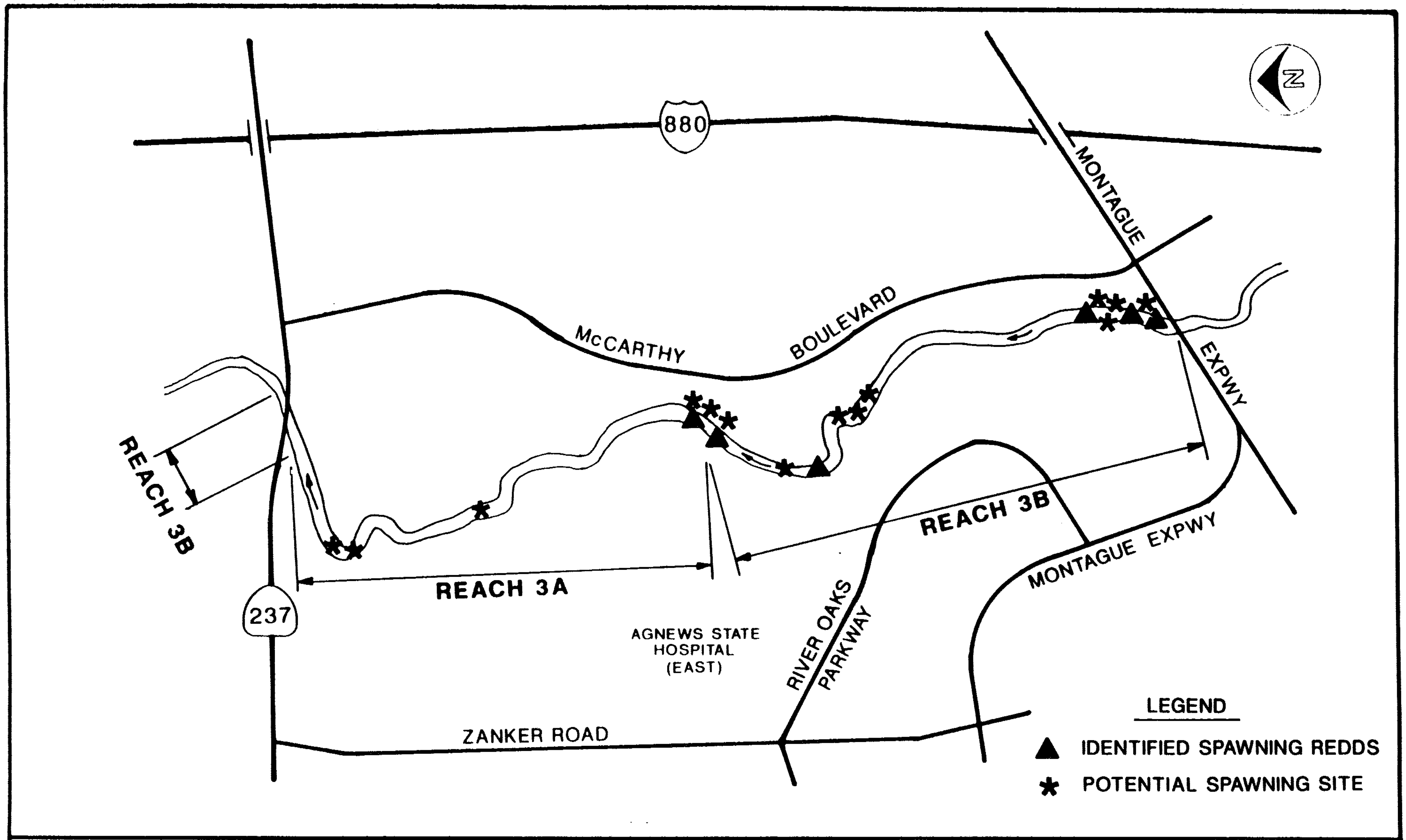
Five redd locations were documented in Reach 3B between Stations 634+00 and 696+00. One redd location was found in Reach 3A. Four other potential spawning locations were identified in Reach 3A; ten other potential spawning sites were identified in Reach 3B between Stations 634+00 and 696+00.

3.3 Existing Functions and Values

3.3.1 Wildlife Habitat

Substantial riparian vegetation is found on both banks of Coyote Creek, forming a riparian corridor that represents one of the most valuable wildlife habitats in Santa Clara Valley. Many species of birds, amphibians, reptiles, and mammals are known from this area, as reported in previous environmental documents (FEIS, FR/EIS, Water District, 1984). The moderate to dense cover and shrubby understory provides nesting, feeding, and resting habitat for wildlife. The USFWS designated the Coyote Creek habitat as a Resource 2 Category resource, with the attendant goal of no net loss of habitat from project implementation (FEIS, 1987).

Riparian birds, a complex assemblage of mostly land birds whose numbers and diversity appear directly related to the diversity and health of the riparian vegetation, occur in Reach 3. Year-round residents include species such as the black-crowned night heron, red-tailed hawk, mourning dove, California quail, Anna's hummingbird, black phoebe,



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE 21

SPAWNING REDDS AND POTENTIAL SPAWNING SITES FOR REACHES 3A AND 3B

0 1600

FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93

scrub jay, northern mocking bird, and red-winged blackbird. The area is also an important resource for migratory birds, including passerine and song-bird species.

The creek's riparian area provides good habitat for reptiles such as the common garter snake; amphibians such as the Pacific tree frog, newts, and salamanders; and mammals such as the opossum, raccoon, striped skunk, fox, and coyote. More xeric areas offer habitat for species such as the western fence lizard.

Riparian vegetation is instrumental in providing cooler stream temperatures for fish. Reach 3 was found to have the most shade cover along the project reaches; approximately 19 percent in the lower half of the reach and 37 percent in the upper half.

3.3.2 Wetlands Values

Coyote Creek wetlands provide high quality habitat value for riparian species and other wildlife species that use the riparian corridor as foraging, hunting, nesting and breeding habitat. The open flowing waters of the creek provide aquatic habitat for fish species, and provide spawning and rearing habitat for steelhead and chinook salmon. An in-depth analysis of the area's value as a riparian and fisheries habitat is included in the FR/EIS and the FEA. Coyote Creek wetlands also provide some flood control and stormwater conveyance functional values, and the surface waters of Coyote Creek are expected to recharge groundwater in the vicinity.

The two excavated depressions fill with local runoff in the spring, forming seasonal ponds that support some wetland vegetation and provide nesting and feeding habitat for waterfowl and shoreline birds in the spring. These depressions are not expected to perform groundwater recharge or water quality improvement functions due to their soils and sparse vegetation. However, since they do retain local runoff in the winter, they may assist with flood control in the vicinity.

3.3.3 Fish Habitat

The fish habitat of lower Coyote Creek has been substantially degraded by past and present land use and watershed management activities in the Santa Clara Valley. At one time, the creek supported at least 16 native freshwater and anadromous fish species (FEA). The FR/EIS stated that probably only four native species remain; however, a subsequent fisheries evaluation study of lower Coyote Creek (HRG, 1989) showed that six native species are found in the creek: the California roach, hitch, Pacific lamprey, Sacramento blackfish, Sacramento sucker, and steelhead trout. The FR/EIS also reported the presence of the native prickly sculpin.

Since preparation of the FR/EIS, a Fisheries Evaluation Report was commissioned by the Water District to respond to agency concerns regarding potential impacts to fish and aquatic resources (HRG, 1989). These studies revealed evidence of steelhead and chinook salmon spawning and rearing activities in Coyote Creek. This new environmental information is summarized in the FEA.

The most critical habitat for steelhead and salmon spawning is the availability of spawning gravel (riffles). Presently, Reach 3 is the only reach within lower Coyote Creek (Reaches 1 through 3) that provides spawning riffles. Section 3.2 of this application details riffle and spawning gravel sites.

Section 4
Impact Analysis and Proposed Mitigation Measures

4.1 Impacts on the Aquatic Ecosystem

4.1.1 Physical/Chemical Characteristics and Anticipated Changes

4.1.1.1 Substrate

Changes to stream substrate in Reach 3A will occur at the channel realignment section where 900 feet of natural channel will be replaced by 630 feet of rock-lined channel. Also within Reach 3A, approximately 300 feet of channel would be lined with rock near the SR 237 bridge. This is described in detail in the section on fisheries habitat below.

Changes to stream substrate in Reach 3B include approximately 220 linear feet of rock lining and approximately 690 linear feet of concrete lining associated with the construction of the SR 237 transition structure. Impacts in Reach 3B also include construction of approximately 700 linear feet of rock lining within all or portions of the channel at Montague Expressway.

4.1.1.2 Flood Control Function of Wetland

Construction of the west levee in Reach 3A would result in a partial loss of approximately 0.4 acres of the excavated depressions which collect local runoff.

For both Reach 3A and Reach 3B, flood control functions would be enhanced by implementation of the project.

4.1.1.3 Water Quality

Impacts to water quality for both Reach 3A and Reach 3B consist primarily of temporary increases in erosion and sedimentation during construction. A Storm Water Pollution Prevention Plan (SWPPD) will be prepared as part of a National Pollutant Discharge Elimination System (NPDES) permit requirement with the Regional Water Quality Control Board (RWQCB). The SWPPP will include measures to control erosion and sedimentation during construction. Placement of rock riprap or concrete will comply with all applicable State water quality standards and the Toxic Effluent Standards of Section 307 of the Clean Water Act. Contaminated soils found within the right-of-way will be removed and disposed of or remediated prior to project construction.

4.1.2 Biological Characteristics and Anticipated Changes

4.1.2.1 Waters

In Reach 3A, there will be a loss of channel length of 250 feet at the sharp bend (ox-bow) where the channel is realigned between Stations 590+00 and 594+00. This channel realignment will convert approximately 900 linear feet of pool run habitat to 630 feet of rocky riffle habitat, for a net loss of 270 linear feet of this habitat. For fisheries, no mitigation is necessary for this loss since the conversion is to a higher value fish habitat. Impacts to riparian habitat have been addressed in the FR/EIS and mitigation will be provided as described in the Habitat Mitigation and Monitoring Program (Appendix C).

4.1.2.2 Wetlands (Special Aquatic Sites)

Wetlands are one type of habitat considered to be a "special aquatic site" according to Corps regulations. Wetland areas within the creek banks in Reaches 3A and Reach 3B are similar in character to the riparian vegetation, with a predominance of herbaceous hydrophytic vegetation. In some areas, narrow (up to 4 feet in width) bands of emergent vegetation grow within the low flow channel, and would be lost within the 900 linear feet of creek proposed for construction of the realigned channel.

Proposed activities in Reach 3A would affect a total of 1.9 acres of jurisdictional waters and wetlands. Of this total area, 0.9 acres are wetlands; 0.4 acres of wetlands would be affected within Coyote Creek, and 0.5 acres of potential wetlands would be affected within the excavated depressions. In addition, excavation of the adjacent overflow channel would cause approximately 0.2 acres of one depression to be excavated deeper, and could indirectly affect an additional 1.2 acres by altering the local hydrology.

Mitigation has been included in the Coyote Creek Reach 3 project for the partial loss of the excavated depressions. Mitigation would consist of creation of new depressions in areas adjacent to the overflow channel west of the existing levee in Reach 3A at a 1:1 ratio.

Approximately 0.8 acres (33,000 square feet) of new jurisdictional waters would be created within the realigned channel. Portions of this 0.8 acres may form wetland communities; however, the area would not form a woody riparian vegetation community, because it would be maintained to prevent growth of dense vegetation that could impede flood waters.

Within Reach 3B, proposed activities would affect a total of 2.1 acres of jurisdictional areas. Of this total area, 0.7 acres are wetlands. In Reach 3B, installation of rock-slope protection and concrete lining are expected to prevent re-establishment of wetland vegetation. These bridge transition structures are being designed to provide rocky riffle and fish spawning habitat, and not wetland habitat.

4.1.2.3 Habitat for Fish and Other Aquatic Organisms

Overall Impacts, Reaches 3A and 3B. Short-term sedimentation and turbidity from levee construction and stream-bank grading could have a negative impact on fish. Sediment discharge could adversely affect spawning substrate for the chinook salmon, steelhead, hitch, prickly sculpin, and Pacific lamprey, and create problems for sight feeding fish such as the Sacramento sucker and prickly sculpin. Mitigation measures, such as seeding bare slopes, would be implemented during construction to minimize erosion and sedimentation impacts. Revegetation planned under the Habitat Mitigation and Monitoring Program will also provide erosion and sediment control. Table 4-1 summarizes mitigation objectives for fish impacts in Reach 3A and Reach 3B. Reach 3 impacts would include:

- Higher water temperatures as a result of the removal of riparian vegetation along the creek from construction activities
- Vegetation loss resulting in the loss of hiding and rearing habitat for fish
- Increased potential for sedimentation of spawning gravels resulting from project construction
- The channel realignment in Reach 3A between Stations 590+00 and 594+00 resulting in the net loss of 270 linear feet of deep pool and run habitat
- The rock lining of the creek under the Montague Expressway in Reach 3B eliminating gravel riffles that have been identified to contain steelhead and salmon spawning sites
- Concrete-lined channel in Reach 3B under SR 237 may create high-flow passage problems for chinook salmon and steelhead

Table 4-1
Mitigation Objectives for Impacts to Fish Habitat to be Caused by the Reach 3 Coyote Creek Flood Control Project

Reach	Habitat Type	Impact/ Modification	Mitigation Objective
3A	Pool/run	Net loss of 270 linear feet	In-kind replacement or replacement of higher value to fishery
3B	Low gradient rocky riffle	Loss of 250 linear feet at SR 237 crossing	In-kind replacement
3B	Spawning riffle (20%), pool/run (80%) combination	Loss of 300 linear feet at Montague Expressway crossing	Replacement/enhancement of riffle at 2:1 gravel volume ratio and in-kind replacement of pool/run or replacement with higher value habitat
3A	Spawning riffle	Potential siltation of approximately 30 linear feet downstream of channel realignment	Abatement of siltation, monitoring, and potential replacement of riffle at 2:1 gravel volume enhancement
3A/3B	Nearshore, overhanging or emergent vegetative cover	Loss of vegetation at crossover and bank revetment areas	Avoidance or replacement with equivalent cover value. Proposed project will eliminate regular clearing of channel vegetation improving overall instream cover conditions compared to existing conditions without flood control project

Sources: John Stanley and Associates et al. (1989), and Reviewing Agency Comments

Shade and Hiding Cover, Reaches 3A and 3B. The Coyote Creek flood control project would cause a loss of 14.5 percent of the trees along Reaches 1 through 3 of Coyote Creek, totalling 13.6 acres. Most of this impact would occur at the crossover and realignment area. The FR/EIS and FEA call for 32.5 ares of revegetation with upper and middle terrace riparian vegetation within the project element as described in the Habitat Mitigation and Monitoring Program. Of this area, 20.3 acres would be revegetated in Reach 3. In addition, plantings are planned in setback areas, in crossover areas (where the overflow channel crosses over the existing channel), and in fishery shade mitigation plantings.

Riparian vegetation losses are described in detail in the FR/EIS and FEA. Steelhead trout and chinook salmon are considered cold water species; therefore, replacing appropriate riparian shade cover to cool the stream will be a necessary mitigation measure. Mitigation for the reduction of vegetation will occur in Reach 3 and has already been undertaken in Reach 2. Plantings will occur in areas that do not currently support shade-producing vegetation or hiding cover. To mitigate for the loss of near bank cover in Reach 3, 2-foot diameter rip-rap will be used. A detailed description of the revegetation and mitigation plans for Reach 3 may be found in Appendices C and D.

Rocky Riffle and Spawning Riffle Habitat.

Channel Realignment, Reach 3A. In Reach 3A, the construction of the channel realignment between stations 590+00 and 594+00, will result in a net loss of 270 linear feet of deep pool and run habitat (refer to previous Figures 9 and 10). The channel realignment will convert approximately 900 linear feet of pool/run habitat to 630 feet of rocky/riffle habitat, for which no mitigation is necessary, since the conversion is to a higher value habitat for fisheries. The channel realignment creates potential for siltation (loss) of about 30 linear feet of spawning riffle downstream of the channel alignment. Mitigation for the potential loss includes monitoring and potential replacement of the spawning riffles with gravels (1- to 3- inch diameter creek-run gravel) at a ratio of 2:1. The complete details of mitigation plans may be found in the Fisheries Mitigation and Monitoring Program (Appendix D).

Concrete-lined Section at SR 237, Reach 3B. As described in the FEA, the proposed concrete-lined channel under SR 237 may pose passage problems and habitat loss for certain fish species. Because of the predicted high stream velocities in the low-flow channel, steelhead and salmon may find it difficult to migrate up this section of the creek. Creation of a low-flow channel and installation of velocity dissipating baffles (Washington baffles) in the low-flow and high-flow channels will be used as mitigation to reduce the effects of this potential velocity barrier (see Figures 12 and 13). The concrete-lined channel would also eliminate 250 feet of rock riffle areas that provide fish spawning sites. Mitigation for this impact described in the FR/EIS includes the placement of rock rip-rap upstream and downstream of the proposed concrete apron to replace lost habitat.

Migration for steelhead and salmon will take place during the late fall, winter, and spring months under high flow conditions. Additional baffles, similar to those in the low flow channel, will be placed along the concrete inverts of the overflow channel to ease fish passage over the concrete apron (Appendix D).

Rock-lined Channel under Montague Expressway, Reach 3B. The FEA calls for the replacement of approximately 300 linear feet of combined pool-run (80 percent) and salmonid spawning riffle (20 percent) habitats with rock-lined channel under the Montague Expressway crossing (see Figures 14 and 15). The rock-lining may result in degradation/siltation of marginal spawning gravels downstream. Mitigation for this loss would be the reconstruction and enhancement of the riffles near the site of the destroyed riffles. Appropriate sized gravel (1 to 3 inch diameter) would be replaced at a ratio of 2:1. The specific locations of gravel replacement will be determined by the Water District in consultation with California Department of Fish and Game (CDFG) before channel modifications (Appendix D).

4.2 Impacts on Resources Outside the Aquatic Ecosystem

4.2.1 Biological Characteristics and Anticipated Changes

4.2.1.1 Vegetation and Wildlife

The FR/EIS and FEA identified significant impacts to riparian vegetation and wildlife species including loss of existing riparian vegetation; loss of wildlife habitat associated with that vegetation; and impacts to wildlife from the creation of breaks along the riparian corridor at the crossover and realignment areas.

The lower Coyote Creek flood control program will cause a loss of 13.6 acres of the existing riparian vegetation, or 14.5 percent of the existing riparian trees in Reaches 2 and 3 combined. The loss of vegetation will create 18 permanent gaps in the riparian corridor. Six gaps are present in Reach 3. These are located on each side of the creek at SR 237 and the Montague Expressway bridge crossings, and at the crossover area. Most of this impact occurs at the crossover and realignment areas. The FR/EIS and FEA call for 32.5 acres of revegetation with upper and middle terrace riparian vegetation within the project element as described in detail in the Habitat Mitigation and Monitoring Program attached (Appendix C). Of this area, 20.3 acres will be revegetated in Reach 3 (see Figure 16). In addition to these 20.3 acres of riparian revegetation, plantings are planned in setback areas, in crossover areas (where the overflow channel crosses over the existing channel), and in fishery shade mitigation plantings. The FR/EIS and FEA evaluated these impacts and requisite mitigation for Reaches 2 and 3 as a whole, and did not provide separate evaluation for Reach 2 or Reach 3 or sub-portions thereof.

In Reach 3A, impacts to vegetation and wildlife will consist of loss of the sharp bend in Coyote Creek about 1,000 feet south of SR 237, at the realignment and crossover area. About 900 linear feet of channel will be cut off and replaced by a rock-lined channel section of about 630 feet in length. Refinements to the Reach 3A in the FEA have resulted in saving about 300 linear feet of riparian vegetation originally expected to be lost near Station 617+00 under the original project description. The refined design has eliminated loss of some riparian vegetation assumed under the FEIS.

In Reach 3B, construction of the concrete-lined channel under SR 237 could create a barrier to wildlife movement. However, a bench beneath the SR 237 bridge has been incorporated into the design to assist in allowing wildlife migration along the creek.

The FR/EIS concluded that the revegetation program will provide new habitat for those species that survive the initial construction impacts. Floodway habitat profiled by the overflow channel will replace upland and agricultural land, which is expected to increase wildlife use of the project area over time.

Mitigation for vegetation loss is covered in the Habitat Mitigation and Monitoring Program provided as Appendix C.

4.2.1.2 *Endangered Species*

The Corps consulted with the USFWS regarding endangered species issues during the preparation of the FEIS, FR/EIS, GDM and FEA. The federally-listed peregrine falcon (*Falco peregrinus*) has been observed foraging in Reaches 2 and 3. The saltmarsh yellowthroat (*Geothlypis trichas sinuosa)* and tri-colored blackbird (*Agelaius tricolor*), identified by the USFWS as Category 2 candidates for listing, are known to utilize riparian vegetation along Coyote Creek. Impacts to foraging and perching habitat for the peregrine falcon will be mitigated through implementation of the revegetation plan. Loss of potential nesting habitat for the saltmarsh yellowthroat and tri-colored blackbird will be mitigated through the revegetation plan.

The California red-legged frog, *(Rana aurora draytonii*), recently proposed for listing as endangered, was observed during 1984 field surveys of Reach 3 (FEIS). The foothill yellow-legged frog (*Rana boylii*), and western pond turtle (*Clemmys marmorata*), federal Category 2 Candidate species, were also observed in Reach 3 (FEIS). Subsequent environmental documents that discuss detailed fisheries and aquatic surveys do not report further sightings of these species in Reach 3.

Mitigation measures for impacts to aquatic habitat were developed and would be implemented through the revegetation and erosion control plans. The revegetation plan is described in detail in the Habitat Mitigation and Monitoring provided as Appendix C.

4.2.2 Socioeconomic Characteristics and Anticipated Changes

Since 1986, Coyote Creek from just north of the Montague Expressway to its mouth has been shown to be a part of the Bay Trail Master Plan (County of Santa Clara, 1993). The Refined Authorized Project Plan will include public access trails in all three reaches, and these trails along Coyote Creek are in compliance with the Master Plan. In Reach 3, a trail segment will be included on the west levees of Coyote Creek. The FR/EIS concludes that no significant impact to recreation will result from the proposed project, since it describes recreational features such as trails incorporated into the new offset levees as compatible with the flood control facilities.

4.2.3 Historic-Cultural Characteristics and Anticipated Changes

As described in the FEA, the State Historic Preservation Officer (SHPO) has concluded that prehistoric archaeological site CA-SC1-675, located in Reach 3, is eligible for the National Register of Historic Places. This is the only site in Reach 3 determined to be eligible for listing. This site cannot feasibly be avoided since project redesign in this area would not allow the reach to function in a hydraulically acceptable manner. Consultation with SHPO will be undertaken by the Water District to develop a Memorandum of Agreement (MOA). The MOA will outline appropriate mitigation, which may include, but not be limited to, data recovery, i.e. excavation and reporting on the finds. In addition, consultation with appropriate Native Americans will be undertaken to determine procedures in the treatment of human and cultural remains associated with the site, should any be discovered during construction of the project at the site. This site will not be disturbed by revegetation plans. These procedures will also address treatment of discoveries for any archaeological remains related to descendant Native Americans elsewhere in the project area.

4.2.4 Hazardous, Toxic, and Radioactive Waste

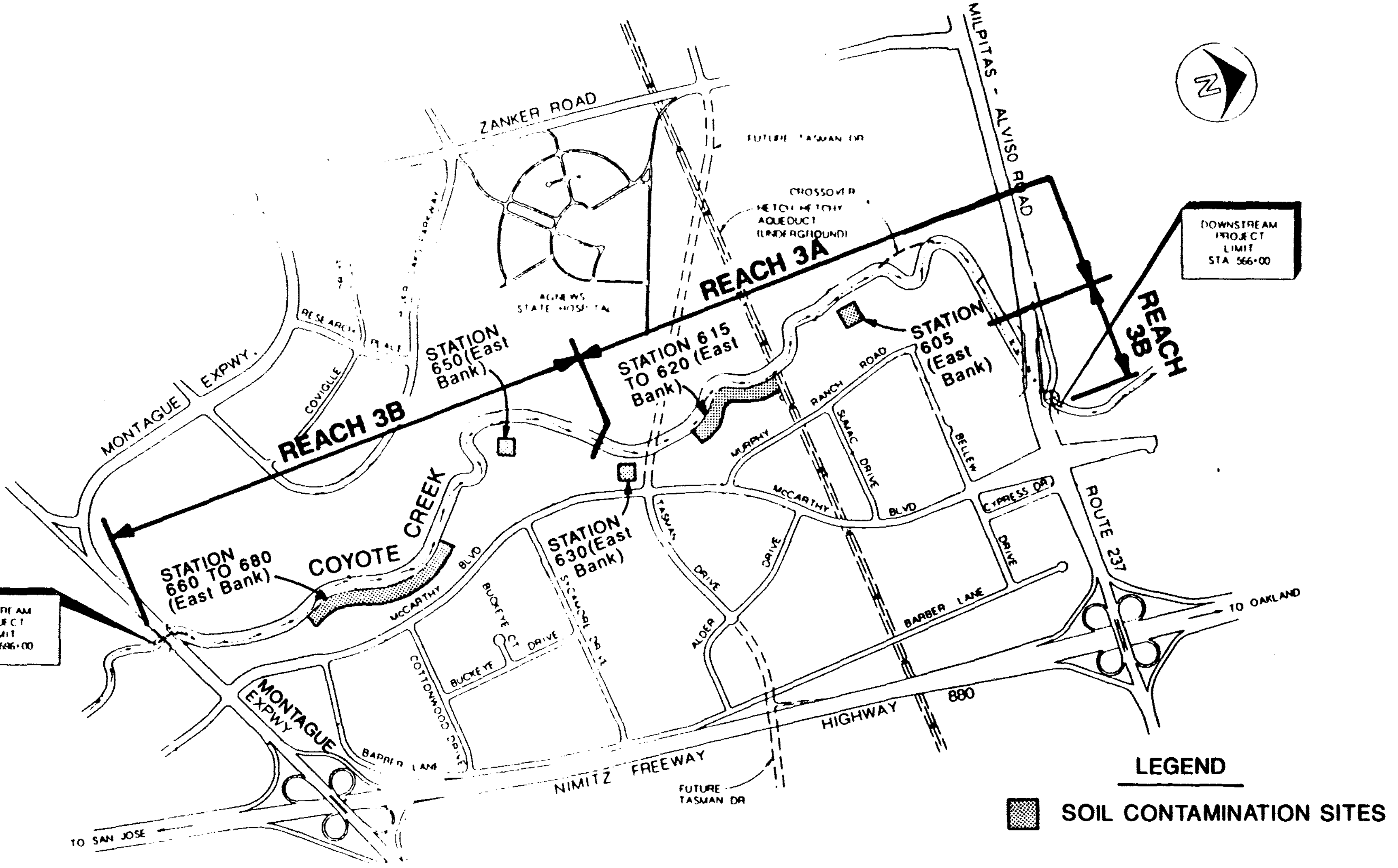
Five areas of contamination were found in Reach 3 as a result of Water District investigations (Figure 22 shows the location of soils contamination areas). In Reach 3A, oil and grease-contaminated soils were found at Station 605+00 on both sides of the creek; concentrations of 900 ppb of DDE, a pesticide, were found at station 615+00. At the section of Reach 3B, from Stations 660+00 to 680+00, on the east bank, trichloroethane, acetone, and Freon 113 were found in the soil. Lead levels in shallow soil samples were detected within Reach 3B and approximately 400 feet of Reach 3A between Stations 630+00 to 650+00, east bank. The Water District is planning cleanup and disposal of contaminated sites. The Water District is planning cleanup and disposal of two sites that could present a potential risk during grading and construction activities. Implementation of these measures will adequately mitigate these potential impacts and no further mitigation will be necessary.

4.3 Summary of Cumulative Impacts

Coyote Creek watershed comprises approximately 322 square miles, making it the largest watershed in Santa Clara Valley. The creek extends from its outfall into the San Francisco Bay upstream 75 miles to the limit of Water District jurisdiction in the east foothills above Anderson Reservoir. The Coyote Creek Watershed below Anderson Reservoir flows 42 miles through the Cities of Milpitas, San Jose, and Morgan Hill and the unincorporated lands of Santa Clara Valley.

As part of the overall project to control flooding on Coyote Creek, the Water District completed construction of Reach 1 of Coyote Creek in 1989. Reach 2 was constructed by the Water District between 1990 and 1992, and full implementation of the mitigation program will be completed in 1993.

Flood control activity on Reach 1 includes construction of levees and retaining walls, and excavation of a bypass channel taking flood waters from Coyote Creek around the south side of Newby Island to Coyote Slough. The FR/EIS plan called for the relocation of Standish Dam from its existing location at the border of Reaches 1 and 2 to approximately 1,290 feet upstream to Reach 2. As a mitigation measure to increase



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE 22

SOILS CONTAMINATION AT REACH 3

0 1800
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93

freshwater habitat upstream of the dam for the steelhead and salmon summer rearing habitat, the dam was repositioned to a site near Dixon Landing Road in Reach 1 in the refined plan.

In Reach 2, earth overflow channels were constructed parallel to the stream corridor. Earth levees were constructed adjacent to the banks of the overflow channel to provide 100-year flood carrying capacity with 3 feet of freeboard. Because of right-of-way constraints, the overflow channel was designed to cross the existing stream in three locations. The Alviso-Milpitas Road bridge was to be removed.

Flood control activities caused the loss of creek meander in Reach 1 and the conversion of a former salt pond to tidal habitat, with associated losses of marsh vegetation and the waterfowl and shorebird habitat associated with the salt pond. A Seasonal Wetland Management Plan was developed to mitigate for the loss of marsh vegetation. This plan includes the creation of a mosaic of seasonal wetland area, channels and islands in the Delta Island area, and a 17-acre pond for waterfowl and shorebirds. Other mitigation measures include the management of a 55-acre area to provide for the salt marsh harvest mouse.

According to the FR/EIS and 1987 FEIS, the Water District is currently studying remedial measures on Coyote Creek between Montague Expressway and Santa Clara Street (a distance of five miles). Alternative measures include bypass channels, floodwalls, excavated channels and levees. At this time, it is not possible to predict which alternative design will be selected, if any. Following this study, Coyote Creek will be studied in phases upstream to Anderson Dam over the next ten years. Remedial measures are likely to include setback levees in the upper reaches, and raising inadequate bridges. Overall, the impacts of these improvements are expected to be low to moderate.

The City of San Jose plans to enlarge three bridges along Coyote Creek at Yerba Buena Road, Fontanosa Avenue and Tennant Avenue. The County plans to enlarge Burnett Avenue bridge. Each project will remove small amounts of riparian woodland. Caltrans plans to remove about one acre of riparian habitat at the Highway 85 connection to South Valley Freeway and is planning to mitigate by planting three acres of riparian habitat.

The City of San Jose's Fisher Creek flood control project will require excavation of Coyote Creek between its confluence and Metcalf Road. Some riparian woodland will probably be removed. A mitigation plan will be devised.

Actions planned by the Water District and the others will cumulatively result in impacts to wetland, riparian and aquatic environments. Even though these projects may collectively cause major impacts, which in some cases are unavoidable, mitigation programs have been designed to offset the environmental damages.

This section presents a review of environmental studies conducted since 1985, to determine how their conclusions have an effect on or are affected by the project. Proposed projects within the cities of San Jose, Milpitas, and the County of Santa Clara were reviewed for relevance to the Coyote Creek Project. Two projects were found that could affect or be affected by the flood control project: the widening of SR 237 in at the downstream end of Reach 3, and the construction of bridges over Coyote Creek in Reach 3 for the Tasman Drive project.

4.3.1 State Highway 237 Widening

The Final EIR/EIS was prepared jointly by Caltrans and the Federal Highway Administration in June of 1990 for the widening of SR 237 between Mathilda Avenue and I-880 (Caltrans, 1990). The proposed SR 237 freeway upgrade project will include the construction of additional bridges across Coyote Creek for access ramps. Caltrans assumes no impacts to the riparian corridor along Coyote Creek at SR 237, since the flood control project will remove existing vegetation. The bridges will be built over a section proposed for concrete apron and therefore will not impact riparian vegetation or proposed revegetation activities. During construction of the bridge across Coyote Creek, spawning habitat and fish passage could be severely affected. To avoid and/or minimize the short-term impacts to biological resources (including fisheries), measures will be incorporated in the SR 237 Freeway Upgrade Project plans, including implementing measures to minimize erosion and sedimentation, fencing off areas not directly affected by the project to avoid inadvertent encroachment, and restricting the construction period to avoid affecting fish migration between October 15 and May 15.

4.3.2 Tasman Drive Project

The Draft EIR/EA for the Tasman Drive/I-880 Interchange and Tasman Drive/Capitol Avenue Extension has been prepared jointly by Caltrans and the Federal Highway Administration (Caltrans, 1991). The proposed Tasman Drive Project includes the construction of bridges over Coyote Creek that will result in the loss of approximately 0.5 acres of riparian vegetation under and immediately adjacent to the future bridge in Reach 3, in the vicinity of Station 630+00. In addition, the project will be crossing Coyote Creek at Revegetation Site 5, taking about 0.35 acre of the proposed revegetation area. The proposed Tasman Drive Project will be responsible for finding a replacement location for the 0.35 acre of previously designated mitigation, in addition to mitigating for the direct impact of the 0.5 acre of riparian vegetation planned for removal. A mitigation ratio of 3.2:1 will be used to compensate for the loss of the 0.5 acre for a total of 1.5 acres. A revegetation area equal to 1.5 acres plus the 0.35 acre of previously designated mitigation area will be required. According to the Draft EIR/EA, up to 2 acres of mitigation area will be revegetated somewhere within Water District flood control revegetation Sites 3 through 9, to be determined by the Water District. Given the extension of needed revegetation sites into Site 7 (see Section 6.3.1.1 of the FEA), the additional 2 acres needed will probably be within Sites 8 or 9.

According to the EIR/EA, planting will be designed to result in no net loss of acreage or habitat value. The planted vegetation at the site is expected to widen the Coyote Creek riparian corridor. The use of temporary irrigation systems is proposed during the establishment period. Monitoring will be in accordance with the requirements of the USFWS and CDFG. The USFWS, CDFG, and Water District will be consulted in determining the final design plans and precise locations for these riparian mitigation plantings along Coyote Creek.

4.4 Public Interest Factors

In its evaluation of permit applications the Corps reviews the proposed project's impacts on a number of public interest factors[1]. Table 4-2 lists 20 public interest factors and summarizes the project's impacts on these public interest factors.

Table 4-2
Applicability of the 20 Public Interest Factors Listed in 33 CFR 325.3 (c) (1)
to the Coyote Creek (Reach 3) Flood Control Project.

Public Interest Factor	Project Impact
1. Conservation	Conservation concerns include temporary and some permanent loss of riparian vegetation, wildlife habitat, aquatic resources, and wetlands in the project area. The mitigation for these losses is described in the Habitat and Monitoring Program (Appendix C) and Fisheries Mitigation and Monitoring Program (Appendix D). Project implementation would maintain the Coyote Creek corridor and increase the amount of open space.
2. Economics	No significant effect on economics are anticipated.
3. Aesthetics	The project is located in an agricultural area with some residential housing. Initial loss of aesthetics caused by vegetation removal will be mitigated by the implementation of the Habitat Mitigation and Monitoring Program (Appendix C).
4. General environmental concerns	The overriding environmental concern in the area is the need to protect the public health from the adverse effects of flooding. Environmental concerns include loss of riparian vegetation, wildlife habitat, aquatic resources, and wetlands (see Section 4 of this permit). These impacts were assessed in the Corps FR/EIS. Mitigation for these losses is described in the Habitat Mitigation and Monitoring Program (Appendix C) and the Fisheries Mitigation and Monitoring Program (Appendix D).

---

[1] U.S. Army Corps of Engineers Regulatory Program Applicant Information Pamphlet EP-1145-2-1; May, 1993.

Table 4-2
Applicability of the 20 Public Interest Factors Listed in 33 CFR 325.3 (c) (1)
to the Coyote Creek (Reach 3) Flood Control Project.

Public Interest Factor	Project Impact
5. Wetlands	**Jurisdictional wetlands occur primarily within the banks of the creek. Other jurisdictional wetlands occur within two excavated depressions. Approximately 1.6 acres of wetlands would be affected by the project; 0.9 acres in Reach 3A and 0.7 acres in Reach 3B. Jurisdictional wetlands are described under Section 5.1 of the Waters and Wetland Report (Appendix B); Section 6.0 describes project impacts to these areas.**
6. Historic properties	One prehistoric archaeological site (CA-SC1-675) has been determined eligible for listing in the National Register of Historic Places. Consultations with the State Historic Preservation Officer have begun to determine appropriate mitigation and procedures during construction. This site and mitigation measures are further described under Section 4.2.3 of this application.
7. Fish and wildlife values	Project impacts affecting fish and wildlife values include loss of riparian vegetation along the creek corridor and cross-over area and loss of spawning habitat in the realigned section and under SR 237 and Montague Expressway. These impacts are detailed in Section 4 of this permit. Mitigation for these impacts is described in the Habitat Mitigation and Monitoring Program (Appendix C) and the Fisheries Mitigation and Monitoring Program (Appendix D).
8. Flood hazards	The project is authorized under the Water Resources Development Act (Public Law 99-662, Sec 401 (c), 100 Stat. 4129); the purpose of the project is to reduce flood hazards along Coyote Creek. An overflow channel and levees will be located parallel to the existing creek to provide flood protection up to the 100-year flood event.
9. Floodplain values	Currently, Coyote Creek's flood plain values are limited; implementation of the project will increase the width of the flood plain and the values it provides.
10 Land use	The flood control project will cause some changes in land use from agricultural to open space/conservation uses.
11. Navigation	Coyote Creek is not generally navigable in Reach 3; the project should not affect navigation in the project area.

Table 4-2
Applicability of the 20 Public Interest Factors Listed in 33 CFR 325.3 (c) (1)
to the Coyote Creek (Reach 3) Flood Control Project.

Public Interest Factor	Project Impact
12. Shoreline erosion and accretion	Erosion of creek banks due to vegetation clearing for flood control activities will be mitigated with seeding and planting of stripped areas. Erosion control measures will be implemented as part of a Stormwater Pollution Prevention Plan (SWPPP) under the NPDES permit.
13. Recreation	The west levees of the proposed flood control plans will include a public access trail as a part of the Bay Trail Master Plan (see Section 4.2.2 of this permit).
14. Water supply and conservation	The project will not affect water supply and conservation other than having the beneficial effects of flood control.
15. Water quality	Impacts to water quality consist of temporary increases in erosion and sedimentation during project construction. The project achieved full compliance with the Clean Water Act under Section 404 (r) when the FR/EIS accompanied by a 404(b)(1) evaluation was submitted to Congress. A SWPPP will be prepared as part of the NPDES permit.
16. Energy needs	The flood control project is not expected to significantly affect public energy needs.
17. Safety	The flood control project is necessary to protect public safety by protecting the area surrounding Coyote Creek from flooding. The project does not create any additional public safety hazards.
18. Food and fiber production	Not applicable
19. Mineral needs	Not applicable
20. Property ownership	The property is owned by the State of California, County of Santa Clara, the Water District, and additional private landowners. Section 6 of the Application for the Department of Army Permit lists property owners.

Section 5

Mitigation and Monitoring Programs

The Habitat Mitigation and Monitoring Program and the Fisheries Mitigation and Monitoring Program developed as part of the Sacramento Corps' General Design Memorandum (GDM) are included as Appendices C and D, and were summarized in the previous section.

Section 6
References

Literature Cited

Caltrans. 1990. Final Environmental Impact Report and Environmental Impact Statement (EIR/EIS) for the State Highway 237 Freeway Upgrade Project. Caltrans and FHA, Sacramento, CA.

Caltrans. 1991. Draft Environmental Impact Report/ Environmental Assessment (EIR/EA) for the Tasman Drive/I-880 Interchange and Tasman Drive/ Capitol Avenue Extension Project. Caltrans and FHA, Sacramento, CA.

Habitat Restoration Group (HRG). 1989. Lower Coyote Creek Fisheries Evaluation Report. March 6.

John Stanley and Associates, Inc., 1989. Lower Coyote Creek Fisheries Evaluation Report. Prepared for the Santa Clara Valley Water District, San Jose, California. File No. 182-19. 49p.

Santa Clara Valley Water District. 1984. Coyote Creek Planning Study (San Francisco Bay to Montague Expressway). Final Environmental Impact Report. October.

U.S. Army Corps of Engineers. 1987. Final Environmental Impact Statement, Coyote Creek Flood Control Proposal, Santa Clara County, California. January.

U.S. Army Corps of Engineers. 1993. Final Environmental Assessment, Proposed Refinements to the Coyote Creek Element of the Coyote and Berryessa Creeks, California, Project. May.

U.S. Army Corps of Engineers. 1993. Final General Design Memorandum. Coyote and Berryessa Creeks, California, Coyote Creek. May.

Other Communication

County of Santa Clara. 1993. Letter of April 5, 1993, from Julie Bondurant, Park Planner, Public Services Agency. Regarding: the need to protect existing riparian vegetation along Coyote Creek, and for continued coordination to insure trail access along Coyote Creek.

Smith, Dr. Jerry. 1993. San Jose State University. Personal Communication, February 12, 1993: Anadromous fish habitat.

APPENDIX A

ENVIRONMENTAL REPORTS
COYOTE CREEK--REACH 3
SANTA CLARA, CALIFORNIA

Compiled from the Interim Feasibility Report/Environmental Impact Statement (FR/EIS) for the Coyote and Berryessa Creeks, California Project (Corps, 1988) and the Final Environmental Analysis (FEA) for Proposed Refinements to the Coyote Creek Element of the Coyote and Berryessa Creeks Project (Corps, 1993)

SUMMARY OF THE INTERIM FEASIBILITY REPORT ENVIRONMENTAL IMPACT STATEMENT

Excerpted from Section One of the Interim Feasibility Report/Environmental Impact Statement for the Coyote and Berreyessa Creeks, California Project (FR/EIS). U.S. Army Corps of Engineers. 1988.

SECTION ONE

SUMMARY

The inclusion of this summary section in the report is required by the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act. It is intended to inform the reader of the major factors which were considered in the investigation, and which influenced the decisions documented in this report. These factors include: (1) major conclusions and findings concerning selected components of the investigation, including critical statutory environmental requirements; (2) areas of controversy regarding the conclusions of the investigation; (3) unresolved issues; (4) the relationship of the alternative plans to national, regional and local environmental requirements and to local planning programs; and (5) the recommendation of the District Engineer based on the conclusions of the investigation.

1.1. MAJOR CONCLUSIONS AND SIGNIFICANT FINDINGS: COYOTE CREEK

1.1.1. Without-Plan Conditions

The term "Without-Plan Conditions," as used in this report, is synonomous with the "No Action Plan." In the future, under without-plan conditions, the cities of San Jose and Milpitas would be expected to experience flooding of a similar frequency and intensity as in the past. Given the present channel capacity of Coyote Creek between Montague Expressway and the old Milpitas Sewage Treatment Plant, the area in the floodplain is subject to flooding from an event likely to be equalled or exceeded once every thirteen years. The most serious aspect concerns the existing levees on Coyote Creek, which are potentially liable to suffer catastrophic failure during a one-percent flood event. Levee failure is most likely to occur between Montague Expressway and Highway 237. Compensation for flood damages would be dependent on the continuation of the existing flood insurance program.

1.1.2. National Economic Development (NED) Plan

The policy of the Corps of Engineers in identifying the NED plan is specified in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. This document states:

"The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements."

"Protection of the Nation's environment is to be provided by mitigation (as defined in 40 CFR 1508.20) of the adverse effects (as defined in 40 CFR 1508.8) of each alternative plan. Accordingly, each alternative should include mitigation determined to be appropriate by the Agency decision-maker."

By definition, the NED plan is the one which maximizes the net national economic development benefits, consistent with the Federal objective. The NED plan is the plan which provides the greatest difference between the average annual benefits and the average annual costs, thereby contributing the most to national economic development.

The construction alternatives included in the final array of flood protection plans for Coyote Creek are the Alternate Sides Overflow Channel and Offset Levees Plan, the Same Side Overflow Channel and Offset Levees Plan, and the Combination Overflow Channel and Offset Levees Plan. Based on an economic analysis of these plans, it was determined that all three alternatives provided optimum protection from the 100-year, or one-percent, flood event. While all three alternative plans yielded positive net benefits and mitigated for adverse impacts, the Alternate Sides Plan had the greatest net economic benefits, and is therefore designated the NED plan for Coyote Creek.

1.1.3. Plan Selection

"The alternative plan with the greatest net economic benefit consistent with protecting the Nation's environment (the NED plan) is to be selected unless the Secretary of a department or head of an independent agency grants an exception when there is some overriding reason for selecting another plan, based upon other Federal, State, local, and international concerns."

The evaluation of the final array of alternative plans for Coyote Creek identified the Alternate Sides Overflow Channel and Offset Levees Plan as the selected plan for implementation. This plan, which is described in detail in Section 4.4.0, was selected because it addresses the planning objectives, it is supported by the local sponsor and the affected municipalities, and it is the plan with the greatest net economic benefits.

1.1.4. Findings Regarding the Riparian Corridor

A study of the existing riparian vegetation along lower Coyote Creek, completed in 1983, identified the existing species of trees, shrubs and ground covers and calculated the age of selected trees. No rare, threatened or endangered, or locally unique plants were encountered in the present Coyote Creek project area during the course of field surveys.

Construction of the recommended flood control project will cause substantial adverse impacts to the riparian corridor. Of the existing 12,335 trees identified in the project area riparian corridor that were over two inches in width in 1983, 1,792 (approximately 14.5 percent of the total) will be removed. This tree removal, resulting largely from the establishment of eighteen permanent breaks in the now-continuous riparian corridor, will cause the loss of approximately 13.6 acres of riparian habitat.

A mitigation plan has been developed to compensate for the riparian losses and impacts to fish and wildlife habitat. Six vacant sites situated on project lands that total approximately 32 acres will be planted with riparian species. Planting at one of the sites, which will serve as a pilot study to evaluate the proposed planting and irrigation methods, has been completed by the local sponsor.

1.1.5. Findings Regarding Endangered Species

Based on information from the U.S. Fish and Wildlife Service (USFWS), there are no listed or proposed threatened or endangered species that occur within the project area (Appendix C). Construction of the proposed channel improvements is therefore not likely to adversely affect threatened or endangered species.

The salt marsh yellowthroat, a bird belonging to the family of warblers, was identified by the USFWS as a candidate species that occurs within the project area. Because the yellowthroat inhabits the riparian zone, construction-related impacts to its habitat are expected due to the removal of vegetation. These relatively short-lived impacts eventually will be more than offset through implementation of the fish and wildlife mitigation plan. The yellowthroat would therefore benefit from the proposed riparian mitigation plan.

Informal consultation with the USFWS will be initiated for the salt marsh yellowthroat to avoid any conflicts at a later date should this species become listed and be present in the area of the proposed action.

1.1.6. Findings Regarding Cultural Resources

An initial cultural resources study conducted in 1983 resulted in the discovery of an archaeological deposit of early 20th century artifacts and the identification of eleven locations where farmsteads were established in the late 19th century. Three of the farmstead locations within the project right-of-way presently contain standing structures.

The archaeological deposit of historic artifacts does not appear eligible for inclusion in the National Register of Historic Places because of extensive disturbance which has adversely affected its depositional integrity. An archaeological monitoring program has been suggested for the project construction phase to collect a sample of the remaining cultural materials, thereby mitigating adverse impacts on the site.

Subsequent to this initial study, the Corps identified additional historic period cultural resources, including another trash deposit, the remains of building foundations and assorted farming implements. These resources do not appear to be eligible for listing in the National Register.

Structures at two of the three farmstead locations within the levee right-of-way of the recommended plan have been assessed for architectural and historical significance. The preliminary determination is that both sites are eligible for listing in the National Register at the local level. Relocation of the affected structures has been suggested as a means to avoid their destruction from levee construction.

The Corps, early in the planning process, coordinated the California State Historic Preservation Officer regarding the results of the initial cultural resources study (see Appendix K). Additional coordination will be initiated during future planning and engineering studies to request review of the preliminary National Register findings.

1.1.7. Findings Regarding Section 404 of the Clean Water Act

A Section 404(b)(1) Evaluation has been prepared for the recommended plan, which concluded that the proposed action complies with the Section 404(b)(1) Guidelines and provisions of the Clean Water Act. No significant adaptations of the Guidelines were made relative to the evaluation.

The use of riprap was necessitated by the need for channel bank stabilization in the design of the recommended flood control plan for Coyote Creek, primarily in the crossover areas. The amount of riprap used and its placement is a function of the design of the overflow channels. The proposed placement of riprap will not violate the applicable state water quality standards, nor will it violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

The proposed fill will not cause significant adverse impacts to human health and welfare. The placement of riprap will not affect municipal and private water supplies, or recreational and commercial fishing. The placement of riprap will not adversely impact any species listed or proposed to be listed as endangered. No critical habitat will be adversely affected, and no sanctuary or refuge violated.

The proposed fill will be placed at overflow channel crossovers where riparian vegetation will be removed, resulting in adverse effects to aquatic and terrestrial wildlife habitat. Mitigation measures will be implemented and maintenance activities followed that will minimize the adverse effects on this habitat.

1.1.8. Areas of Controversy

The major area of controversy raised by federal and state agencies, environmental organizations and members of the local communities is the removal of riparian vegetation, which will result in permanent breaks in the riparian corridor at several locations on the creek. While there is public consensus that flood protection is necessary, organizations and individuals support a flood control plan only if it preserves the riparian vegetation along the Coyote Creek.

1.1.9. Unresolved Issues

One unresolved issue relates to the position of the Environmental Protection Agency that the recommended flood control plans do not comply with the Clean Water Act Section 404(b)(1) Guidelines (see Appendix H).

1.2. MAJOR CONCLUSIONS AND SIGNIFICANT FINDINGS: BERRYESSA CREEK

1.2.1. Without-Plan Conditions

The term "Without-Plan Conditions", as used in this report, is synonomous with the "No Action Plan". Under without-plan conditions, flood damage would be likely to occur within the foreseeable future. Given the present channel capacity of Berryessa Creek between Old Piedmont Road and Calaveras Boulevard, the area in the floodplain is subject to flooding from an event likely to occur once every three to ten years. Compensation for these damages would be dependent on the continuation of the existing flood insurance program.

1.2.2. National Economic Development (NED) Plan

Included in the final array of alternatives for Berryessa Creek are the Rectangular Concrete Channel Plan, the Trapezoidal Concrete Channel Plan and Slope Protection, and the Trapezoidal Concrete Channel Plan. Based on an economic analysis of these plans, it was determined that all three alternatives provided optimum protection from the 100-year flood event. However, the net economic benefits for the Rectangular Concrete Channel Plan were negative. Both of the other two plans had positive net benefits, with the Trapezoidal Concrete Channel Plan providing the greatest net economic benefits. It is therefore designated the NED plan for Berryessa Creek.

1.2.3. Plan Selection

For Berryessa Creek, the evaluation of the final array of alternative plans identified the Trapezoidal Concrete Channel Plan as the plan selected for implementation. This plan, described in detail in Section 5.6.0, was selected because it addresses the planning objectives, has the support of the local sponsor and the affected municipalities, and has the greatest net economic benefits.

1.2.4. Findings Regarding the Riparian Corridor

No rare, threatened or endangered, or locally unique plants were encountered during the course of field surveys conducted in the Berryessa Creek project area. There are few trees remaining along Berryessa Creek except in the greenbelt area. Construction of the proposed project will adversely impact up to 189 trees. Mitigation measures have been developed to offset the impacts to riparian vegetation. Two trees will be planted in the greenbelt for every one lost or otherwise impacted by the proposed project.

1.2.5. Findings Regarding Endangered Species

Based upon information provided by the U.S. Fish and Wildlife Service, there are no listed or proposed threatened or endangered species, as well as candidate species, within the project area. Construction of the proposed channel improvements is therefore not likely to adversely affect such species.

1.2.6. Findings Regarding Cultural Resources

Archaeological surveys and research of available records show that one prehistoric period archaeological site is within the project area. No historic period cultural resources were identified in the project area.

The prehistoric site was bisected by the realignment of Berryessa Creek, and erosion of the streambanks has exposed human burials and washed away other cultural materials. In 1986, archaeologists and a Native American consultant completed the recovery of cultural materials, including human skeletal remains, that were discovered eroding from the streambank. Marine shell in the excavated material was carbon dated to 1,660 years before present.

The Corps will coordinate with the California State Historic Preservation Officer, in accordance with federal regulations, to request an evaluation of the recent findings and a determination whether the site is eligible for listing in the National Register of Historic Places.

1.2.7. Findings Regarding Section 404 (Clean Water Act)

A Section 404 (b)(1) Evaluation has been prepared for the recommended plan, which concluded that the proposed action complies with the Section 404 (b)(1) Guidelines and provisions of the Clean Water Act.

No significant adaptations of the Guidelines were made relative to the evaluation.

The use of concrete lining was necessitated by the need for channel bank stabilization in the design of the recommended flood control plan for Berryessa Creek. The amount of concrete used is a function of the design width of the channel. The proposed placement of concrete will not violate the applicable state water quality standards, nor will it violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

The proposed channel lining will not cause significant adverse impacts to human health and welfare. The placement of concrete will not effect municipal and private water supplies, or recreational and commercial fishing.

The concrete channel lining will not adversly impact any species listed or proposed to be listed as endangered. No critical habitat will be adversely affected, and no sanctuary or refuge violated. The proposed channel lining will result in some unavoidable losses of wildlife habitat, for which mitigation measures will be implemented to minimize the adverse effects on wildlife and riparian vegetation.

1.2.8. Areas of Controversy

There are no areas of controversy regarding the implementation of the proposed flood protection plan.

1.2.9. Unresolved Issues

For the flood control plan recommended in this report for Berryessa Creek, the only unresolved issue is in regard to prehistoric cultural resources. If the recorded archaeological site is determined eligible for listing in the National Register of Historic Places through coordination with the California State Historic Preservation Officer, appropriate measures would have to be developed and implemented to mitigate the construction-related impacts.

1.3. RELATIONSHIP OF ALTERNATIVES TO ENVIRONMENTAL REQUIREMENTS

The federal, state and local laws, policies and plans applicable to the alternatives in the final array are discussed in paragraphs 1.3.1 to 1.3.19. The following laws and policies were examined and found to be not applicable to the final array of alternatives discussed in this document:

- Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 et seq.
- Estuary Protection Act, 16 U.S.C. 1221 et seq.
- Land and Water Conservation Fund Act, 16 U.S.C 4601 et seq.
- Marine Protection Research and Sanctuaries Act of 1972, as amended, 16 U.S.C 1401 et seq.
- River and Harbor Act, 33 U.S.C. 401 et seq. (Requirements of the Act met by Corps planning action.)
- Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001 et seq.
- Executive Order 11990, Protection of Wetlands, 24 May 1977, (42 FR 26961, 25 May 1977)
- Department of the Army, Chief of Engineers, Wetland Policy

The degree to which each alternative complies with the applicable laws, policies and plans is summarized in Tables 1.1 and 1.2, for Coyote Creek and Berryessa Creek, respectively.

1.3.1. National Environmental Policy Act of 1979, as amended (NEPA), 42 U.S.C. 4321 et seq.

NEPA established a national environmental policy to ensure that federal actions do not contribute to undesirable and unintended environmental impacts. Federal agencies are required to comply with procedures established by the Act and published as Federal Regulations. A detailed Environmental Impact Statement (EIS) is required by NEPA for every recommendation or report on proposals for legislation and other federal actions, such as civil works projects, that may significantly affect the quality of the human environment. This combined Feasibility Report and EIS satisfies the requirements of the National Environmental Policy Act.

1.3.2. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

The objective of the Clean Air Act is to protect and enhance the quality of the nation's air resources, to promote public health and welfare and the productivity of its population. Under this Act the administrator of the U.S. Environmental Protection Agency (EPA) has established a set of Ambient Air Quality Standards, but the primary responsibility for the prevention and control of air pollution is left to the states and to the local agencies within each state. In areas where the Ambient Air Quality Standards are not expected to be met by a certain date, the state or local agency would have to develop an Air Quality Maintenance Plan or a Non-Attainment Plan outlining control measures that would be implemented to achieve or maintain the air quality of a specific region or air basin.

The study area is located within the San Francisco Bay Area Air Basin, which has been designated by EPA as an Air Quality Maintenance Area (AQMA). The air quality standards of the AQMA were not met by the target date of 1987. The Act requires federal agencies to perform an Air Quality Analysis for a project that is located within an AQMA to determine the effect of the proposed action on the local Air Quality Maintenance Plan (Appendix G). Construction of the recommended alternative for Coyote Creek would accelerate growth in the Alviso area. This forecast development would produce an increase in traffic with its attendant increase in auto emissions, therefore becoming a contributing factor to the violation of the applicable air quality standards. Pollutants generated during the construction of both the recommended Coyote and Berryessa plans, as well as the accelerated development in Alviso, would consist primarily of fugitive dust (suspended particulate), which would remain within an acceptable range.

1.3.3. Clean Water Act, 33 U.S.C. 1344, Section 404(b)

The objective of the Clean Water Act is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Section 404(b) of the Clean Water Act, as amended in 1977, requires that the Corps of Engineers evaluate the impact of the discharge of dredged or fill material into waters of the United States in order to make specified determinations and findings. In the case of Coyote Creek and Berryessa Creek, an evaluation as specified in Section 404(b)(1) has been included in this report as Appendix D. When submitted to Congress, this procedure will satisfy Section 404(r) in lieu of issuing a public notice and obtaining a State of California water quality certificate. The findings of the Section 404(b)(1) Evaluation indicate that the proposed placement of fill (riprap) complies with the objective of the Act.

1.3.4. Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq.

This Act established a program to provide federal protection for selected rivers and river segments which are "free-flowing" and have "outstandingly remarkable values." A river or segments of one may be added to the National Wild and Scenic Rivers System either by direct congressional designation or by approval of the Secretary of the Interior of state-designated wild, scenic, or recreational rivers.

This Act requires that all federal agencies involved in planning for the use and development of water and related land resources shall consider the effects of the proposed plans on rivers or river areas included in the National System or identified in the Department of Interior's Nationwide Inventory of potential additions to the System. A proposed undertaking located on or affecting such rivers or river areas must include an evaluation of the effects of the agency's action which may conflict with the purposes of the Act, as well as an examination of alternative uses of the water resources.

The Department of the Interior to date has not included Coyote Creek or Berryessa Creek in their list of qualified rivers. Requirements of the Act are therefore not applicable to the recommended plans at this time. If the eligibility criteria for inclusion to the National System were applied, however, Coyote Creek may qualify as it meets the criterion of free-flowing even though there are existing modifications, is considered to have high wildlife-habitat value as well as historic values. The would probably not fulfill the wild or scenic classification because of the extensive urban and industrial development along many segments.

Lower Coyote Creek conceivably could be classified as a recreational river since it appears to meet the three criteria: (a) accessible by road or railroad, (b) includes some residential, commercial or similar development and (c) has existing diversions, modifications or other minor structures. However, such a classification is not recommended at this time because of the limited recreational uses of the project area, currently jogging and walking, bird watching, and occasionally canoeing when sufficient water is flowing.

1.3.5. Executive Order 11988 - Flood Plain Management

This executive order requires federal agencies to recognize the significant value of flood plains, and to consider the public benefits that would be realized from the restoration and preservation of the flood plain. The objective is the avoidance, to the extent possible, of adverse short term and long term effects associated with the occupancy and modification of the base floodplain (base floodplain = 100-year flood plain). Under this order the Corps of Engineers is required to provide leadership in taking action to (1) avoid development in the base flood plain, where practicable, (2) reduce the hazard and risk associated with flooding, (3) minimize the impact of floods on human safety, health and welfare, and (4) restore and preserve the natural and beneficial values of the base flood plain.

The evaluation of the recommended plan shows that it is in full compliance with Executive Order 11988, since it will reduce the hazards and risks associated with flooding and minimize the impact of floods on human safety, health and welfare. Implementation of the plan would not, of itself, induce development of the floodplain which would not otherwise occur. There is no practicable way of preserving or restoring the beneficial values of the base floodplain, since the floodplain is already so largely developed.

1.3.6. Archaeological and Historic Preservation Act of 1974, 16 U.S.C. 469 et seq.

This Act amended The Reservoir Salvage Act of 1960 and is directed to the preservation of historic and archaeological data that might otherwise be lost or destroyed as a result of any federal construction project or federally licensed or assisted activities. It authorizes the Secretary of the Interior, or the lead agency of a project, to undertake the recovery, protection or preservation of such data. The agency involved may undertake recovery or preservation with their own funds, at up to one percent of project funds, or it may request the Secretary of the Interior to perform preservation measures. Actions to meet these requirements would continue through the detailed design and construction phases of the proposed plan. The plan is considered to be in partial compliance of the Act until these requirements are met.

1.3.7. Executive Order 11593: Protection and Enhancement of the Cultural Environment, 36 CFR 8921, 13 May 1971

This Executive Order requires federal agencies to (1) inventory the cultural resources on lands under their jurisdiction, (2) outline measures to actively protect and preserve these cultural resources, (3) nominate to the National Register of Historic Places those inventoried cultural resources considered significant, and (4) initiate measures to ensure that their policies contribute to the protection and preservation of non-federally owned cultural resources. Actions to meet these requirements would continue through the detailed design and construction phases of the proposed plan. The plan is considered to be in partial compliance with the Executive Order until these requirements are met.

1.3.8. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

The National Historic Preservation Act of 1966 (NHPA) established the National Register of Historic Places: a listing of sites, districts, structures and objects significant in American history, architecture, archaeology, engineering and culture. Cultural resources of local, regional, state and national significance may be eligible for inclusion in the National Register. The NHPA requires federal agencies to take into account the effects of a proposed project on cultural resources listed, or eligible for listing, in the National Register. This requirement involves coordination between the federal agency, the California State Historic Preservation Officer and the Advisory Council on Historic Preservation to formulate a plan to avoid or mitigate any adverse effects due to the project, and includes a Memorandum of Agreement to implement the selected plan. Coordination is continuing between the Corps of Engineers and the State Historic Preservation Officer. Until the Agreement is finalized, the proposed flood control improvements are considered to be in partial compliance with the Act.

1.3.9. Fish and Wildlife Coordination Act, 16 U.S.C. 661 et seq.

The Fish and Wildlife Coordination Act requires that federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) and with the state agency exercising administrative authority over wildlife resources, before they may propose or authorize to impound or divert the waters of any stream or other body of water, or to deepen a stream channel. The reports and recommendations of USFWS must become an integral part of the reports for engineering surveys when submitted to Congress for authorization. The proposed plan shall include such mitigation for wildlife purposes as the reporting agency recommends for adoption to obtain maximum overall project benefits. The final Fish and Wildlife Service Coordination Act Report is included in Appendix C, and all recommendations presented by the Service have been addressed in Sections Four and Section Five for Coyote Creek and Berryessa Creek, respectively.

1.3.10. Endangered Species Act of 1973, 16 U.S.C. 1531 et seq.

Section 7(a) of the Act requires a consultation with the Secretary of the Interior (through the U.S. Fish and Wildlife Service) to determine if any endangered or threatened species may be present in the area of a proposed Corps action, and to ensure that the action will not jeopardize the continued existence of a species by destroying or adversely modifying the critical habitat of such species. No species were listed as endangered or threatened in the project area (see sections 1.1.5. and 1.2.5. and Appendix C).

1.3.11. Farmland Protection Policy Act, 7 U.S.C. 4201 et seq.

A final rule of the Department of Agriculture was published as 7 CFR Part 658 to implement this Act, which is in Subtitle I of Title XV of the Agriculture and Food Act of 1981 (Public Law 97-98). The rule requires that, prior to taking or approving any action that would result in conversion of prime farmland to non-agricultural uses, a federal agency examine the effects of an action and if there are adverse effects on farmland preservation, consider alternatives to lessen adverse effects. The Department of Agriculture Soil Conservation Service has prepared a distribution map of prime farmland (1979) for the lower Coyote Creek area. Although the land has been previously used for agriculture, the map designates the area on either side of the Creek adjacent to the project area as proposed urban land use. Thus, there is no prime farmland that might be affected by a flood control project and no effect on farmland preservation. The proposed action is therefore in full compliance with the Act.

1.3.12. Executive Order 11990, Protection of Wetlands, 42 FR 26961

Under this Executive Order, federal agencies are directed to provide leadership to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial qualities of these lands. The agency should also avoid undertaking or providing support for new construction involving draining, dredging, channelizing, filling, diking, impounding and other related activities located in wetlands unless the agency head finds that (1) no practicable alternative exists and (2) all practical measures have been taken to minimize harm to wetlands. In making this finding the agency head may take into account economic, environmental and other pertinent factors. (See Wetland Policy Compliance, page 13.)

1.3.13. Department of the Army, Chief of Engineers, Wetlands Policy

This policy declares wetlands to be vital areas constituting productive and valuable public resources. Alteration or destruction of wetlands is discouraged as contrary to the public interest. Wetland functions considered important to the public interest are delineated in the July 9, 1977 Federal Register (33 CFR 320.4(b)). Federal projects affecting a particular wetland site will be evaluated with respect to the complete wetland area. No construction activity will occur in wetlands designated as important to the public interest, unless the District Engineer concludes that the benefits of the alteration outweigh the damage to the wetlands. In such a case the District Engineer must demonstrate the need to locate the project in the wetland and must evaluate the availability of feasible alternative sites. (See Wetland Policy Compliance, page 13.)

1.3.14. Federal Water Project Recreation Act, 16 U.S.C. 4601-12

This Act requires the Corps of Engineers to give full consideration to opportunities for outdoor recreation afforded by proposed projects. It also allows federal assistance for recreation as part of water resources developments and requires a non-federal agency to provide 50% of the recreation costs and assume operation and maintenance of the facilities. Either the City of San Jose or County of Santa Clara would be invited to be the local sponsor for a recreational element since both entities include development of a trail system as part of their general plans. Lower Coyote Creek is a designated segment of the Trails and Pathways Master Plan, but final plans for this section of the Creek have not yet been developed. The recommended plans are in partial compliance with this Act.

1.3.15. State of California Wetlands Policy

Under this policy, the California Resources Agency and its various departments will not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all of the following conditions are met: (1) The project is water dependent; (2) No feasible, less environmentally damaging alternative is available; (3) The public trust is not adversely affected; and (4) Adequate compensation is part of the project.

Wetland Policy Compliance

Along the reach of Coyote Creek, the proposed channel improvements are directly related to the containment of floodwaters to protect the highly urbanized areas of San Jose from the Montague Expressway to the old Milpitas wastewater treatment plant. The proposed flood control improvements on Berryessa Creek, from Old Piedmont Road to Calaveras Boulevard, are designed to protect residential areas of San Jose and industrial areas of Milpitas. In each case, no feasible, less environmentally damaging alternative has been identified during the plan formulation process. On balance, the public interest will benefit from the proposed improvements. A mitigation program for each creek, proposed to restore habitat equivalent to that riparian habitat lost due to construction, has been included as a part of the project authorization. The mitigation plans are described in detail in the project descriptions, Section Four and Section Five. Therefore, the proposed plan is in full compliance with Executive Order 11990 (Protection of Wetlands), the Chief of Engineers Wetland Policy, and the State of California Wetlands Policy.

1.3.16. Santa Clara County General Plan (Parks and Recreation)

The basic goals for recreational and cultural facilities along Coyote Creek, as presented in the Santa Clara County General Plan, include: (1) a continuous system of maintained hiking trails with interspersed picnic areas, paved bicycle paths and separate equestrian trails, integrated with a continuous greenbelt along the Creek, and (2) preservation of the historical, archaeological and cultural heritage of the area.

Berryessa Creek is already partly channelized, with a minimum of right of way for access. A section of Berryessa Creek runs through an existing greenbelt/park, where the riparian corridor of mature trees merges with landscaped park vegetation. This park is featured in the Santa Clara County General Plan.

The alternatives considered for Coyote Creek and Berryessa Creek are compatible with the recreational elements of the Santa Clara County General Plan. The recreational features specified above can be incorporated into the flood control plans recommended in this report.

1.3.17. San Jose General Plan

The General Plan for the City of San Jose (Horizon 2000) addresses the various aspects of preservation and development for the city in general and for Coyote Creek in particular. Relevant topics include: (1) water resources, (2) open space and aesthetics, (3) recreation, including a trail system, (4) land use, (5) environmental impacts including mitigation, (6) flood protection, and (7) historical, cultural and archaeological resources. For the area adjacent to lower Coyote Creek, the future land use projections include light industrial/industrial parks and public lands, including Agnews State Hospital.

Berryessa Creek is addressed specifically only in respect to flood control. Presently, the San Jose area adjacent to Berryessa Creek is fully developed as a medium density residential community. Future land use is not expected to change. The San Jose General Plan specifies that protection from a 100-year flood, or one percent flood, should be achieved in accordance with the Federal Flood Insurance Program design standards.

1.3.18. Milpitas General Plan

The General Development Plan for the City of Milpitas addresses various topics for city development, including open space and conservation. Topics involving Coyote Creek include (1) parks and recreational development, (2) flood control and (3) open space and aesthetics. The plan for future development on land adjacent to Coyote Creek includes light manufacturing and industrial parks. Berryessa Creek is addressed in regard to recreational and aesthetic values. Projections for future development in the Berryessa Creek project area include light manufacturing/industrial parks and retail development.

1.3.19. Santa Clara Valley Water District

The Santa Clara Valley Water District, the project local sponsor, has initiated construction of a flood control project on lower Coyote Creek, i.e., the lowest reach that extends from the old Milpitas Sewage Treatment Plant downstream to the confluence of Coyote Creek and Coyote Slough. The purpose of the local improvements is to prevent induced flooding from the federal recommended plan and to provide 100-year flood protection in this lowest reach. The Corps of Engineers flood control study is based on the assumption that the local sponsor will have completed construction of the improvements before federal implementation of any proposed flood protection plan. The completion date for local improvements is expected to be the end of 1988.

1.4. RECOMMENDATION BY THE DISTRICT ENGINEER

1.4.1. Recommendation for Coyote Creek

It is recommended that the flood control improvements for Coyote Creek, in the cities of San Jose and Milpitas, Santa Clara County, California, be authorized for implementation as a federal project. These improvements would include an overflow channel and offset levees within the project limits from Montague Expressway to the old Milpitas Sewage Treatment Plant. It is further recommended that the plan be modified at a later date to provide recreational features and facilities developed in cooperation with the appropriate local, state and federal agencies. Suitable fish and wildlife mitigation features will be incorporated into the plan. For the purposes of this report, the recommended project is called the Alternate Sides Plan.

The total first cost of the recommended plan is currently estimated at $29,930,000. The economic benefits associated with this plan are estimated to be $5,087,000 in average annual terms, compared to $3,148,000 in average annual costs (all price levels March 1986). The benefit/cost ratio for the recommended plan is approximately 1.6, with annual net benefits of $1,939,000.

1.4.2. Recommendation for Berryessa Creek

It is recommended that the flood control improvements for Berryessa Creek, in the cities of San Jose and Milpitas, Santa Clara County, California, be authorized for implementation as a federal project. These improvements would include sedimentation basins, trapezoidal concrete channels and an offset levee and berm system, within the project limits from above Old Piedmont Road to Calaveras Boulevard. The appropriate fish and wildlife mitigation will be incorporated into the project. For the purposes of this report, the recommended project is called the Trapezoidal Concrete Channel Plan.

The total first cost of the recommended plan is currently estimated at $9,213,000. The economic benefits associated with this plan are estimated to be $1,353,000 on an annual average basis, with annual average costs of $981,000 (all price levels March 1986). The benefit/cost ratio for the recommended plan is approximately 1.4, with annual net benefits of $372,000.

TABLE 1.1

DEGREE OF COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

COYOTE CREEK

ENVIRONMENTAL REQUIREMENT	Alternate Side	Same Side	Combination
FEDERAL			
1. National Environmental Policy Act	FC	FC	FC
2. Clean Air Act	PC	PC	PC
3. Clean Water Act, Section 404(b)	FC	FC	FC
4. Fish and Wildlife Coordination Act	FC	FC	FC
5. Endangered Species Act, Section 7	FC	FC	FC
6. Executive Order 11988, Flood Plain Management	FC	FC	FC
7. Executive Order 11990, Wetlands	FC	FC	FC
8. Chief of Engineers Wetland Policy	FC	FC	FC
9. National Historic Preservation Act	PC	PC	PC
10. Executive Order 11593 - Protection & Enhancement of Cultural Environment	PC	PC	PC
11. Farmland Protection Policy Act	FC	FC	FC
12. Estuary Protection Act	NA	NA	NA
13. Federal Water Project Recreation Act	PC	PC	PC
14. Land and Water Conservation Fund Act	NA	NA	NA
15. River and Harbor Act	NA	NA	NA
16. Watershed Protection and Flood Prevention Act	NA	NA	NA
17. Archaeological and Historic Preservation Act	PC	PC	PC
18. Wild and Scenic Rivers Act	FC	FC	FC
19. Marine Research and Sanctuaries Act	NA	NA	NA
20. Coastal Zone Management Act	NA	NA	NA
STATE			
21. State of California Wetlands Policy	FC	FC	FC
LOCAL			
22. Santa Clara County General Plan	FC	FC	FC
23. San Jose General Plan	FC	FC	FC
24. Milpitas General Plan	FC	FC	FC

Legend: FC = Full compliance - All requirements of the law, policy or related regulations have been met.
PC = Partial compliance - Some requirements of the law, policy or related regulations have been met.
NC = Non compliance - None of the requirements of the law, policy or related regulations have been met.
NA = Not applicable - The law, policy or related regulations do not apply.

TABLE 1.2

DEGREE OF COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

BERRYESSA CREEK

ENVIRONMENTAL REQUIREMENT	Rect. Concrete Channel	Trap. Conc. w/ Slope Prot.	Trap. Concrete Channel
FEDERAL			
1. National Environmental Policy Act	FC	FC	FC
2. Clean Air Act	PC	PC	PC
3. Clean Water Act, Section 404(b)	FC	FC	FC
4. Fish and Wildlife Coordination Act	FC	FC	FC
5. Endangered Species Act, Section 7	FC	FC	FC
6. Executive Order 11988, Flood Plain Management	FC	FC	FC
7. Executive Order 11990, Wetlands	FC	FC	FC
8. Chief of Engineers Wetland Policy	FC	FC	FC
9. National Historic Preservation Act	PC	PC	PC
10. Executive Order 11593 - Protection & Enhancement of Cultural Environment	PC	PC	PC
11. Farmland Protection Policy Act	FC	FC	FC
12. Estuary Protection Act	NA	NA	NA
13. Federal Water Project Recreation Act	PC	PC	PC
14. Land and Water Conservation Fund Act	NA	NA	NA
15. River and Harbor Act	NA	NA	NA
16. Watershed Protection and Flood Prevention Act	NA	NA	NA
17. Archaeological and Historic Preservation Act	PC	PC	PC
18. Wild and Scenic Rivers Act	FC	FC	FC
19. Marine Research and Sanctuaries Act	NA	NA	NA
20. Coastal Zone Management Act	NA	NA	NA
STATE			
21. State of California Wetlands Policy	FC	FC	FC
LOCAL			
22. Santa Clara Parks and Recreation Plan	FC	FC	FC
23. San Jose General Plan	FC	FC	FC
24. Milpitas General Plan	FC	FC	FC

Legend: FC = Full compliance - All requirements of the law, policy or related regulations have been met.
PC = Partial compliance - Some requirements of the law, policy or related regulations have been met.
NC = Non compliance - None of the requirements of the law, policy or related regulations have been met.
NA = Not applicable - The law, policy or related regulations do not apply.

SUMMARY OF THE FINAL ENVIRONMENTAL ASSESSMENT

Excerpted from Section 1.0 of the Final Environmental Assessment (FEA) for the Coyote Creek Project Element of the Coyote and Berryessa Creeks, California Project. U.S. Army Corps of Engineers. 1993.

1.0 Summary

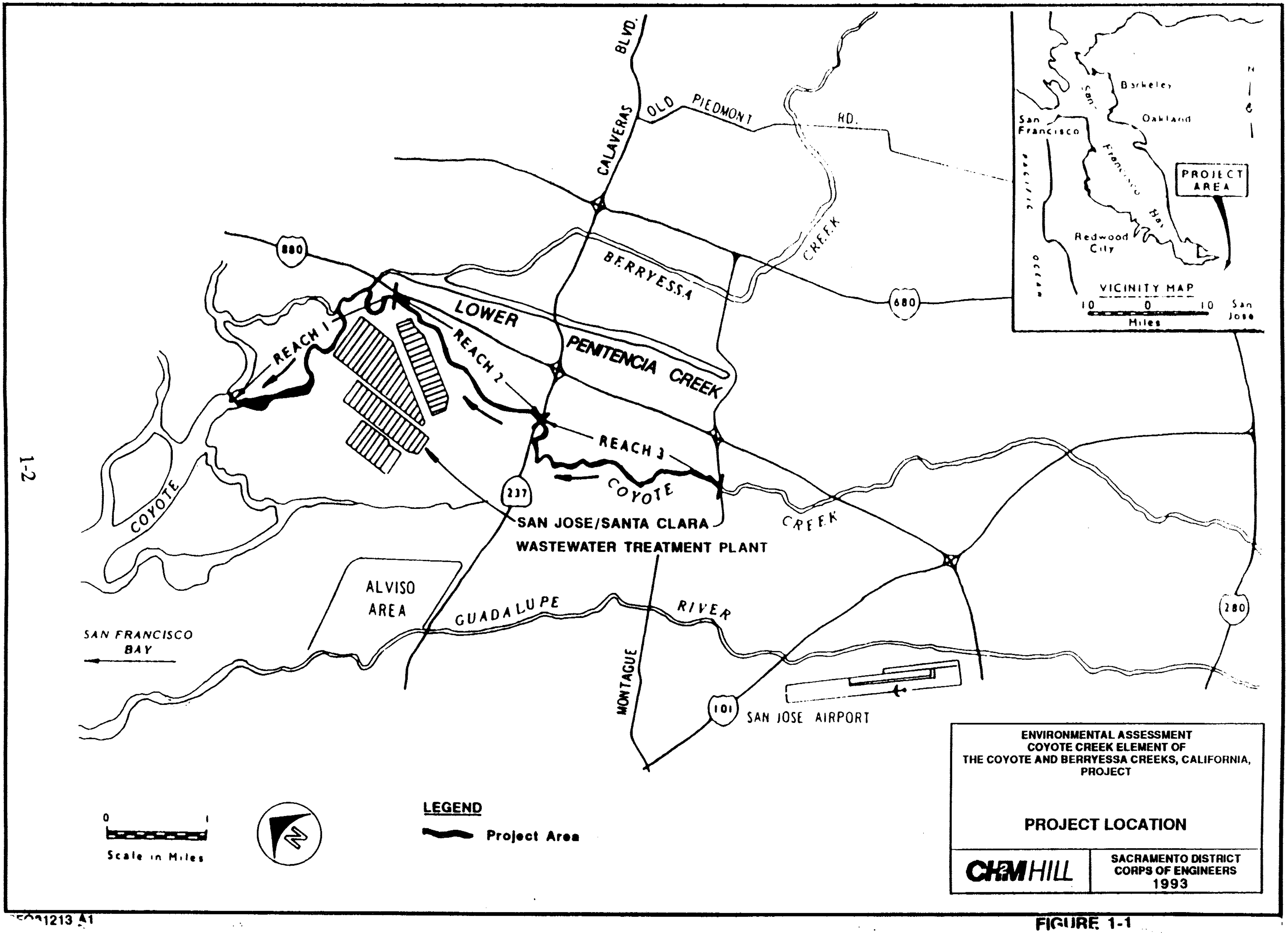
1.1 Project Background

The Coyote Creek Element of the Coyote and Berryessa Creeks, California, Project (Coyote Creek Project Element) is located along the lower portions of Coyote Creek in the northeastern portion of the Santa Clara Valley, extending approximately 7 miles along Coyote Creek from the southern tip of San Francisco Bay to the Montague Expressway in the cities of San Jose and Milpitas. The project study area is divided into three reaches (Reaches 1, 2, and 3), as shown on Figure 1-1, Project Location Map.

The Coyote Creek Project Element has evolved through a series of engineering and environmental studies led by the local sponsor, Santa Clara Valley Water District (SCVWD), and the U.S. Army Corps of Engineers (Corps). In 1984, the SCVWD prepared the Engineers Report and Final Environmental Impact Report (FEIR) for the Coyote Creek Planning Study, San Francisco Bay to Montague Expressway (SCVWD, 1984). The SCVWD then applied for a Corps of Engineers Section 404/10 permit for this project, prompting the Corps to prepare the Coyote Creek Flood Control Proposal Final Environmental Impact Statement (FEIS), in January 1987. This environmental document incorporated information developed for the salt marsh harvest mouse found in Reach 1 after the preparation of SCVWD's EIR, including mitigation developed for the Wetland Habitat Management Plan (Harvey and Stanley, 1987). With the exception of revegetation measures, Reach 1 was constructed by SCVWD, the local sponsor, in 1987.

In 1988, the Corps finalized the Interim Feasibility Report and Final Environmental Impact Statement (FR/EIS) for Coyote Creek and Berryessa Creek, covering Reaches 2 and 3 of Coyote Creek. The SCVWD has since completed construction of Reach 2. Because the SCVWD is seeking credits and reimbursement from the Corps for construction of Reaches 1 and 2, those reaches must be included in a General Design Memorandum prepared by the Corps, along with Reach 3. Under the National Environmental Policy Act of 1969 (NEPA), the Corps must address any changes to the project or new information developed since its preparation of the FEIS and FR/EIS, even though construction has been partially completed. This is the purpose of this Environmental Assessment (EA).

Since preparation of the FR/EIS, a Fisheries Evaluation Report was commissioned by SCVWD to respond to state and federal agency concerns regarding potential impacts to fish and aquatic resources. The California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS) indicated that issuance of future permits would be dependent on compliance with the recommendations of the fisheries report. The Fisheries Evaluation Report studies revealed evidence of steelhead and chinook salmon runs in Coyote Creek. Several new mitigation measures were proposed in the Fisheries Evaluation Report to minimize potential impacts to these species, as described in Section 4.0, Significant Resources, and Section 5.0, Impacts and Mitigation.



ENVIRONMENTAL ASSESSMENT
COYOTE CREEK ELEMENT OF
THE COYOTE AND BERRYESSA CREEKS, CALIFORNIA,
PROJECT

PROJECT LOCATION

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

SFO31213.A1

FIGURE 1-1

Additional studies completed since preparation of the Corps' environmental documents include the evaluation of the previously identified cultural resources in the Section 106 consultation process, and a Hazardous and Toxic Waste Assessment completed by RESNA for the SCVWD (RESNA, 1992).

The basic plan consists of an overflow channel (Reaches 2 and 3) and a bypass channel (Reach 1) to accommodate floodwaters, and offset earthen levees to contain the flows. The Refined Authorized Project Plan follows the same basic design as the Authorized Project Plan, with some design refinements in levee design and placement and overflow channels slope and width, and additional mitigation measures incorporated to minimize impacts to wetlands and riparian vegetation, wildlife, fisheries, and hazardous waste.

1.2 Purpose of the Environmental Assessment

The purpose of this EA is to identify and describe the environmental effects of proposed refinements to the Authorized Project Plan that originated from changes in the surrounding environment, refinements in project design, and new environmental information. The Coyote Creek Project Element consists of the construction of about 6 miles of overflow channels and offset levees, as well as the implementation of a mitigation plan for riparian planting on 32.5 acres with periodic monitoring and documentation. The Coyote Creek Project Element will provide portions of Milpitas, Alviso, and San Jose with flood protection up to the 100-year event. The Authorized Project Plan is described in the Interim Feasibility Report and Environmental Impact Statement, Coyote Creek and Berryessa Creek, April, 1988, which is referred to as the FR/EIS.

This EA has been prepared to meet the requirements of the NEPA, as amended. This EA describes project refinements and new environmental information resulting from additional studies developed subsequent to the preparation of the FR/EIS and FEIS documents, and addresses whether these would result in new significant impacts and concerns not addressed in the FR/EIS or FEIS. This EA incorporates by reference the previous FR/EIS and FEIS prepared by the Corps, as well as the Coyote Creek Engineer's Report and FEIR prepared by the project non-Federal local sponsor, the Santa Clara Valley Water District (SCVWD, 1984).

This EA is intended to evaluate those impacts resulting from changes or new information, and will not reevaluate already identified impacts of the Authorized Project Plan. The currently proposed project refinements described in this EA do not involve changes to the basic design of earthen levees and overflow channels. Changes consist of refinements to the overflow channel depth and width, replacement of a 900-foot floodwall with a levee, and changes in proposed mitigation measures to take into account new information on fisheries, cultural resources, and hazardous waste.

A draft of this EA, a draft Finding of No Significant Impact, and a Section 404(b)(1) evaluation was circulated on March 11, 1993, to interested agencies, organizations, and individuals for review and comment by April 5, 1993. Several comments were received which required clarification of the loss of tidal channel habitat in Reach 1 and mitigation for that loss, and of the location and mitigation for loss of portions of the existing seasonal ponds in Reach 3. Text and plate changes have been incorporated to respond to those comments. Other comments addressed recreational issues and trails; these issues are not affected by the proposed refinements and are therefore not considered in detail in this EA.

1.3 Project Description

Coyote Creek originates in the Diablo Mountain Range along the eastern edge of Santa Clara County, and flows in a northeasterly direction through the cities of Morgan Hill, San Jose, and Milpitas, into the southern end of San Francisco Bay. The Coyote Creek Project Element is located along the lower portions of Coyote Creek in the northeastern portion of the Santa Clara Valley. Flooding on Coyote Creek in the project area and surrounding areas has been a recurring problem since the early 1900s. Severe flooding from overtopping the creek banks occurred most recently during the winter of 1982 and 1983, when many public and private facilities were damaged by inundation. In the winter of 1982, flood waters damaged approximately 800 acres and inundated an estimated 260 homes and 60 businesses. In early January 1983, flood waters inundated approximately 4,000 acres and damaged about 360 homes and 40 businesses.

In evaluating flood control options in the FR/EIS, the Corps considered 12 alternatives, 6 of which were alternative structural designs. A structural alternative was selected as the recommended plan in the FR/EIS. In selecting the recommended plan, impacts to and mitigation for riparian and aquatic habitat and associated wildlife species, as well as project costs and land acquisition logistics, were considered. The recommended plan from the FR/EIS is referred to in this EA as the Authorized Project Plan. Following is a brief summary of the recommended plan in the FR/EIS (Authorized Project Plan), which also corresponds to the No-Action Alternative of this EA. The current Refined Authorized Project Plan (Proposed Action) is also described. For a more detailed description of these two plans, see Section 3.0, Alternatives.

1.3.1 FR/EIS Authorized Project Plan (No-Action Alternative)

The Authorized Project Plan corresponds to the Alternate Sides Overflow Channel and Offset Levees Plan in the FR/EIS, and to the Proposed Project Overflow Channel in the FEIS. The basic design consists of an overflow channel (Reaches 2 and 3) and a bypass channel (Reach 1) to accommodate floodwaters and offset earthen levees to contain the flows.

The design elements of Reach 1, 2, and 3 are summarized as follows:

- Reach 1 extends approximately 2.5 miles from the confluence of Coyote Creek and Coyote Slough to the old Milpitas Sewage Treatment Plant. It includes a bypass channel (Reach 1B) conveying floodwaters away from lower Coyote Creek to the existing Coyote Slough, around the south side of Newby Island.

- Reach 2 extends approximately 2.0 miles upstream from Reach 1 to SR 237, and includes levee construction and excavated earth overflow channels on both sides of the creek. Standish Dam, a temporary summer dam located at the boundary of Reach 1 and Reach 2, was planned to be relocated to a point 1,290 feet upstream of its original location.

- Reach 3 extends approximately 2.5 miles upstream from Reach 2 to the Montague Expressway bridge. In Reaches 2 and 3, the overflow channel generally parallels the existing creek corridor, crossing the creek in four places. For most of its length in Reach 3, the overflow channel is located on the west side of the existing creek, crossing over to the east side at a sharp bend in the creek about 1,000 feet upstream of SR 237. At this location, the existing creek channel would be cut off and a realigned section would be constructed for a length of about 500 feet. A 700-foot concrete-lined section will be constructed under SR 237, with a low-flow channel and baffles to facilitate fish passage through this section. A 1,100-foot floodwall was proposed instead of a levee on the west side of the center of Reach 3, to protect existing riparian vegetation.

An extensive riparian revegetation program and wetlands mitigation program, including provision of 32.5 acres of riparian revegetation to replace the 13.6 acres to be lost as a result of flood control facilities construction, was developed as part of the Authorized Project Plan.

In 1989, SCVWD, the local sponsor, completed construction of Reach 1, with the exception of the revegetation plantings. The lower portion of Reach 2 (Reach 2A) was constructed by SCVWD in 1990 followed by construction of the upper portion (Reach 2B) in 1992. The SCVWD intends to construct a portion of Reach 3 in 1993/1994. The Corps plans to construct the remainder of the Coyote Creek Project in 1995.

1.3.2 Refined Authorized Project Plan (Proposed Action)

The Refined Authorized Project Plan follows the same basic design as the Authorized Project Plan, with additional mitigation measures incorporated to minimize impacts to wetlands and riparian vegetation and to wildlife and fisheries. In 1987, SCVWD commissioned preparation of a Fisheries Evaluation Report (The Habitat Restoration Group [HRG], 1989a) to respond to agency concerns regarding potential impacts to fish and aquatic resources. New information on fisheries revealed evidence of steelhead and salmonid spawning and the importance of the summer lake created behind Standish Dam for providing rearing habitat for juvenile salmonids. Mitigation was coordinated with the USFWS, CDFG, the Corps, and SCVWD.

Refinements include:

- Changing the proposed location of Standish Dam to Reach 1 to accommodate seasonal rearing habitat for steelhead and salmon, which in turn requires mitigation for associated loss of tidal channel area through lowering of a salt-pond levee, described in detail in Section 3.1.1

- Adding mitigation for newly discovered impacts to salmon and steelhead habitat, including shade plantings to mitigate for loss of shade and for the associated warming of the creek water, and replacement of rocky riffles and spawning gravels

- Changing or adding to the proposed locations of portions of the riparian revegetation sites to ensure sufficient revegetation area in Reaches 2 and 3

- Design changes to the overflow channel slopes in Reach 3 resulting in a narrower channel, which in turn reduces impacts to existing riparian vegetation and allows the proposed floodwall to be replaced with a levee

- Changes to the baffle design to facilitate fish passage in the concrete-lined section under SR 237

In addition, detailed and specific measures for public recreation facilities have been developed for the Refined Authorized Project Plan in Reach 1, which include the following:

- Trash containers
- Benches
- Public access signs
- Trails
- Limited vehicle access

These measures were developed in coordination with the Bay Conservation and Development Commission (BCDC) for Permit 5-84.

It was also determined that the Refined Authorized Project would encroach on the Caltrans right-of-way for Route 237. A standard encroachment permit will be filed before construction in this area.

1.4 Major Conclusions and Findings

1.4.1 Riparian and Wetlands Vegetation and Wildlife

No new impacts to riparian vegetation will result from implementation of the Refined Authorized Project Plan beyond those already anticipated in the Authorized Project Plan. The Refined Authorized Project Plan will have a reduced impact on existing riparian area in Reach 3, with avoidance of a 300-foot-long area of existing riparian vegetation that would have been removed under the Authorized Project Plan.

Several changes to the project environment have required refinements and additions to the proposed revegetation sites, to ensure provision of the 32.5 acres of revegetation sites needed:

- Site 2A was added in Reach 2 because post-construction surveys of the Sites 1 and 2 area showed a shortage of 1 acre.

- Similarly, 3.5 acres was added to Site 7 to compensate for a 3.5 acre shortfall in the expected area of proposed sites 3 through 6.

- Additional mitigation area totalling 0.65 acres was also added in Site 9 to compensate for portions of the originally proposed revegetation Sites 4 and 5 that will not be available for planting. A 0.3 acre portion of Site 4 is within the Hetch-Hetchy aqueduct right-of-way where tree planting is not permitted; construction of the Tasman Drive extension will eliminate 0.35 acres of Revegetation Site 5.

- Construction of the levees would remove a portion of the two seasonal ponds that form in borrow pits along the west bank of Coyote Creek south of SR 237. These ponds provide waterfowl and shorebird nesting and feeding habitat, and mitigation will be provided by providing additional pond area contiguous with or adjacent to the remaining ponds in the proposed overflow channel, as described in detail in Section 3.

1.4.2 Fish and Aquatic Resources

After preparation of the FR/EIS, the Fisheries Evaluation Report commissioned by SCVWD revealed the presence of steelhead and salmon spawning and rearing habitat in the reaches of Coyote Creek affected by the project. Mitigation for impacts to this newly discovered habitat have been developed in coordination with USFWS and CDFG. The impacts and their mitigation measures are outlined as follows:

- Loss of riparian vegetation could lead to increased water temperatures, affecting rearing habitat value. Additional planting areas have been provided to provide shade in the Delta Islands area and in Reaches 2 and 3. The

Delta Islands side slopes have been steepened and the channels narrowed to allow planting of vegetation that will overhang the water to provide shade.

- Loss of riparian habitat could lead to loss of hiding cover for juvenile fish in the cross-over areas. The size of rip-rap to be used in these areas has been increased to 2-foot diameter rip-rap, to provide hiding cover.
- Relocation of Standish Dam to Reach 2 to a point upstream of its original location, as proposed in the Authorized Project Plan, would result in loss of steelhead rearing habitat in the seasonal lake. The seasonal dam has been relocated to a point near Dixon Landing Road, 1,560 downstream of its original location (2,760 feet downstream of the proposed location). This relocation includes 1,290 feet to increase the area of seasonal lake, and 270 feet to mitigate for loss of deep pool and run habitat in Reach 3.
- The dam relocation caused loss of tidal influence to an additional 3,590 feet of tidal channel beyond that expected in the Authorized Project Plan. Mitigation for this impact has already been provided by improving the tidal action to 4,715 feet of dredged channel along the inside of former salt ponds in lower Coyote Slough, as shown in Section 5.
- The seasonal dam could interfere with juvenile fish migrating downstream. The operation of the dam has been changed so that the flashboards are in place only from the beginning of May to the beginning of October. A surface spill weir, such as a V-notch weir and sluiceway/tidegate is proposed to assist downstream migration.
- The concrete-lined section under SR 237 could interfere with anadromous fish passage during high flows. Additional baffles have been designed for the high-flow area of the concrete-lined section.
- Construction will cause the loss of recently identified spawning riffles. Mitigation for this loss would consist of reconstruction and enhancement of riffles near the sites of the destroyed riffles.

1.4.3 Endangered Species

No new significant impacts to endangered species have been identified beyond those anticipated in the Authorized Project Plan, and no change has occurred in the status of the Category 2 candidate species, the salt marsh yellowthroat. Loss of peregrine falcon resting and feeding habitat is provided through the riparian revegetation plan. Salt marsh yellowthroat habitat is being provided in Reach 1 as part of revegetation efforts in that Reach.

1.4.4 Cultural Resources

In compliance with mitigation measures identified in the FR/EIS and FEIS for the Authorized Project Plan, the State Historic Preservation Officer (SHPO) was consulted on the sites identified in those documents. The SHPO concurred that none of those sites were eligible for listing in the National Register of Historic Places. Since that time, however, a new prehistoric archaeological site (CA-SCl-675) was discovered as part of a survey for the Tasman Drive Extension EIR, and has been determined to be eligible for listing.

By letter dated 5 April 1993 (included in Appendix C), the State Historic Preservation Officer (SHPO) has concluded that prehistoric archaeological site CA-SC1-675 is eligible for the National Register of Historic Places. This site cannot feasibly be avoided since project redesign in this area would not allow the reach to function in a hydraulically acceptable manner. Under the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR 800), consultation will be undertaken by the Corps to develop a Memorandum of Agreement (MOA). The MOA will outline appropriate mitigation, which may include, but not be limited to, data recovery, i.e. excavation and reporting on the finds. In addition, consultation with appropriate Native Americans will be undertaken to determine procedures in the treatment of human and cultural remains associated with the site, should any be discovered during construction of the project at the site. These procedures will also address treatment of discoveries for any archaeological remains related to descendant Native Americans elsewhere in the project area.

1.4.5 Hazardous, Toxic, and Radioactive Waste

Five areas of contamination were found in Reach 3 as a result of SCVWD investigations. Of these, two sites were determined to have contamination levels that could present a potential risk during grading and construction activities. One of these is an oil and grease contaminated area on the east bank for which SCVWD is planning removal and disposal of contaminated soils this spring before construction. The second is an area of pesticide contamination on the east bank for which SCVWD is also planning cleanup and disposal of contamination this spring. Implementation of those measures will adequately mitigate these potential impacts, and no further mitigation will be necessary.

1.4.6 Recreation

No new significant impacts to recreational facilities are anticipated under the Refined Authorized Project Plan. Compliance with BCDC permit 5-84 will ensure the integrity of recreational opportunities within the project.

serious aspect concerns the existing levees on Coyote Creek, which are potentially liable to suffer catastrophic failure during a one percent flood event. Levee failure is most likely to occur in the reach between Montague expressway and Highway 237.

4.4. ALTERNATE SIDES OVERFLOW CHANNEL AND OFFSET LEVEES PLAN

4.4.1. Plan Description

The basic objective of this plan is to reduce flood damages in the cities of San Jose and Milpitas at the least cost to the federal government and to local interests. The flood damage reduction would be accomplished by providing an overflow channel to accommodate the floodwaters, and offset earthen levees to contain the flows. This plan takes advantage of the land adjacent to the Creek that has been dedicated for flood control rights-of-way. The location of the overflow channel would alternate sides due to right-of-way constraints. This plan is shown on Plate 4.1.

This alternative would feature an overflow channel and offset levee on the west side of the Creek, from Montague Expressway downstream to approximately 500 feet south of the property line between the State of California and the River Oaks Associates. For the next 850 feet, a floodwall would replace the west levee. On the east side of the creek, an offset levee would be constructed from Montague Expressway to approximately 40 feet downstream of the Prudential Insurance Company property, where an exterior augmentation to the existing levee would be constructed to the property line of Peery & Arrillaga and McCarthy.

Downstream of the property line of Peery & Arrillaga and McCarthy, an 800 foot rock-lined channel alignment would replace the meander in the natural channel, and the overflow channel would cross over the Creek to the east side at this alignment. A rock-lined transition would lead into a trapezoidal concrete channel under the Highway 237 bridge, and lead out again downstream. North of Highway 237, the overflow channel would begin on the east side of the Creek, and cross to the west side approximately 1,800 feet downstream. The overflow channel would continue on the west side for approximately 4,000 feet, at which point it would divide in two with a rock-lined crossover at this junction. Downstream about 2,000 feet, a meander in the Creek would be realigned, and the west side overflow channel would cross over a rock-lined junction and merge with the overflow channel on the east side of the Creek, before terminating at the old Milpitas Sewage Treatment Plant.

In the overflow channel, the bottom of the proposed excavated bench would average five feet in height above the existing channel bottom, allowing the low flows to be contained within the natural Coyote Creek channel and riparian corridor.

4.4.2 Mitigation Measures

A mitigation plan was developed for this flood control alternative to provide full compensation of fish and wildlife habitat losses. The

1.5 Areas of Controversy

Areas of controversy for the Authorized Project Plan centered on the impacts to the riparian corridor and associated wildlife resulting from the loss of 13.6 acres of riparian vegetation and creation of 18 breaks in the riparian corridor. Issues that arose after the FR/EIS and that have been addressed through incorporation of mitigation measures concern the discovery of steelhead and salmon spawning habitat in the creek. In response to this significant discovery, refinements to the project and to the originally proposed mitigation measures have been developed in coordination with the CDFG and USFWS, as described in detail in Section 5.2.

1.6 Unresolved Issues

Subsequent to the preparation of the FR/EIS, a prehistoric cultural resource site was discovered during archaeological surveys conducted for the Tasman Drive Extension/Interchange Project EIR. In 1989, the firm Archaeological Resource Management identified this previously unknown prehistoric archaeological site (CA-SCl-675) on the west side of Coyote Creek, within the Area of Potential Effect (APE). The APE is the area that would be disturbed during construction activities for the Coyote Creek Project Element. The site is buried beneath several feet of soil and was test excavated to define its composition and limits.

By letter dated 5 April 1993, the State Historic Preservation Officer (SHPO) has concluded that prehistoric archaeological site CA-SC1-675 is eligible for the National Register of Historic Places. This site cannot feasibly be avoided since project redesign in this area would not allow the reach to function in a hydraulically acceptable manner. Under the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR 800), consultation will be undertaken by the Corps to develop a Memorandum of Agreement (MOA). The MOA will outline appropriate mitigation, which may include, but not be limited to, data recovery, i.e. excavation and reporting on the finds. In addition, consultation with appropriate Native Americans will be undertaken to determine procedures in the treatment of human and cultural remains associated with the site, should any be discovered during construction of the project at the site. These procedures will also address treatment of discoveries for any archaeological remains related to descendant Native Americans elsewhere in the project area.

1.7 Relationship to Pertinent Environmental Requirements

This section addresses the relationships of the Proposed Action to pertinent federal, state, and local environmental laws; the project is in full compliance with these laws.

1.7.1 Impacts to Wetlands (Executive Order 11990, Protection of Wetlands)

Policies and guidelines of the Department of the Army, the State of California, and the President of the United States provide for the protection and conservation of wetlands. This executive order directs federal agencies to take all practicable measures to avoid the destruction and modification of wetlands. Studies conducted since the FR/EIS have discovered that the Authorized Project Plan will impact additional wetlands. A partial loss of seasonal ponds, about 2.4 acres, resulting from construction of a levee in Reach 3 would result from the Authorized Project Plan. Preliminary results of a field investigation made by the San Francisco Corps Regulatory Branch in April indicate that the northern pond is likely to qualify as waters of the United States, but does not appear to meet the criteria for a wetland due to the lack of vegetation in that pond. Portions of the southern pond appear to meet the criteria for a wetland.

Mitigation has been included in the Refined Authorized Project Plan for the partial loss of seasonal ponds. Mitigation would consist of creation of new pond area adjacent to the unaffected ponds, to replace the loss of a portion of the ponds to levee construction. These ponds total 7.8 acres. The northern pond has little developed wetland vegetation, except along the edges. The southern pond supports some wetland vegetation. Wetland functions and values are primarily of bird habitat value. These ponds do not perform significant groundwater recharge or water quality improvement functions. Mitigation as described is in compliance with the intent of this order. Mitigation as described is in compliance with the intent of this order.

1.7.2 Impacts to Fish and Wildlife (Fish and Wildlife Coordination Act)

The Fish and Wildlife Coordination Act requires that federal agencies consult with USFWS and state wildlife agencies (CDFG) for projects such as this. The USFWS has prepared an Endangered Species Coordination Update Letter and a Planning Aid Letter, that address impacts to fish and wildlife. These letters are included with this EA in Appendix A. This EA describes fish and wildlife impacts identified as a result of new information, and the coordination letter and this EA conclude that these impacts have been adequately evaluated and satisfactory mitigation has been included in the Refined Authorized Project Plan in consultation with the USFWS.

1.7.3 Impacts to Endangered Species (Endangered Species Act, Section 7)

Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), requires federal agencies to consult with the Secretary of the Interior through USFWS to determine if any threatened or endangered species, or their habitat, may be adversely affected by the project. The USFWS has been consulted in developing the Refined Authorized Project Plan and has prepared an Endangered Species Coördination Update Letter and a Planning Aid Letter, which are in Appendix A. No new impacts to endangered, threatened, or candidate species would occur as a result of the project refinements. Satisfactory mitigation has been provided through the revegetation program for impacts to peregrine falcon resting and foraging habitat, and for previously identified impacts to the salt marsh yellowthroat.

1.7.4 Impacts to Cultural Resources (National Historic Preservation Act and the Historical and Archaeological Data Preservation Act)

Section 106 of the National Historic Preservation Act of 1966, as amended, and other laws and regulations require that the appropriate authorities and interested members of the public be provided with the opportunity to comment on the effects of a project on National Register of Historic Places properties. In accordance with these requirements, the SHPO was requested to comment on project impacts.

By letter dated 5 April 1993, the State Historic Preservation Officer (SHPO) has concluded that prehistoric archaeological site CA-SC1-675 is eligible for the National Register of Historic Places. This site cannot feasibly be avoided since project redesign in this area would not allow the reach to function in a hydraulically acceptable manner. Under the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR 800), consultation will be undertaken by the Corps to develop a Memorandum of Agreement (MOA). The MOA will outline appropriate mitigation, which may include, but not be limited to, data recovery, i.e. excavation and reporting on the finds. In addition, consultation with appropriate Native Americans will be undertaken to determine procedures in the treatment of human and cultural remains associated with the site, should any be discovered during construction of the project at the site. These procedures will also address treatment of discoveries for any archaeological remains related to descendant Native Americans elsewhere in the project area.

Under authority of Public Law 93-291, up to 1 percent of total federal project costs may be spent on mitigation of cultural resources impacts by the project without further authorization. Should additional mitigation be needed that would extend beyond the authorized 1 percent, a waiver to exceed the 1 percent would have to be approved by the Department of the Army and then submitted to the Secretary of the Interior.

1.7.5 Impacts to Water Quality [Clean Water Act, Section 404(b)(1)]

Impacts to water quality were addressed in the FR/EIS and have not significantly changed with the Refined Authorized Project Plan. The changes proposed in the flood control improvements would result in no net change of vegetation lost or proposed mitigation. To achieve Clean Water Act compliance, an addendum to the FR/EIS 404(b)(1) evaluation has been prepared for the project. This evaluation appears in Appendix B. The 404(b)(1) evaluation covers the entire project, including those changes and refinements that have been made to the project since the FR/EIS. The evaluation accompanying the Draft EA has been revised to update quantity estimates of fill and excavated materials based on the Refined Authorized Project Plan. These revisions are minor, consisting of a reduction in the amount of rip-rap expected to be used in Reach 3 by about 600 cubic yards, in an area on the west bank of the creek about 5,000 feet upstream from SR 237.

The project achieved full compliance with the Clean Water Act under Section 404 (r) when the FR/EIS accompanied by a 404(b)(1) evaluation was submitted to Congress. Section 404(r) of the Clean Water Act waives the requirement to obtain state water quality certification. The Section 404(b)(1) evaluation presented in the FR/EIS has been updated to reflect the Refined Authorized Project Plan (see Appendix B). The findings of the Section 404(b)(1) evaluation indicate that the Refined Authorized Project Plan complies with the objectives of the Clean Water Act.

ALTERNATIVE ANALYSIS

Excerpted from Section 4 of the Interim Feasibility Report/Environmental Impact Statement for the Coyote and Berreyessa Creeks, California Project (FR/EIS). U.S. Army Corps of Engineers. 1988.

SECTION FOUR

COYOTE CREEK ALTERNATIVES

4.1. INTRODUCTION

This section describes the preliminary plans for Coyote Creek that address the planning objectives, and detailed plans which are included in the final array of plans considered for implementation. The recommended plan is described in detail.

4.2. PRELIMINARY PLANS

The preliminary plans considered for alleviating flood damages from Coyote Creek are described in the following paragraphs.

4.2.1. No Action Plan

The Corps of Engineers is required to consider the option of "No Action" as one of the alternatives in accordance with the National Environmental Policy Act (NEPA). With the No Action plan, which is synonymous with the "Without Project Condition," it is assumed that no flood control project would be implemented by the federal government or by local interests. The No Action Plan is the basis from which all impacts are measured. Since this plan is required by NEPA to be included among the candidate plans in the final array of alternatives, it is described in detail in Section 4.3.

4.2.2. Nonstructural Measures

A number of nonstructural management measures were considered as possible means of reducing flood damage in downtown San Jose, the Alviso area and Milpitas. The evaluation of these measures was based primarily on Corps of Engineers data.

4.2.2.1. Flood Insurance. The Federal Emergency Management Agency (FEMA) has delineated the boundaries of the 100-year flood plain in Flood Insurance Rate Maps (FIRMs). FEMA has directed the Federal Insurance Administration to provide federally subsidized flood insurance for those residents and businesses projected to be impacted by flooding, under the authority of the Flood Insurance Act of 1968, as amended, and emergency assistance, under the Flood Disaster Protection Act of 1973. This measure has been implemented in the study area, and is part of the future without-project condition.

4.2.2.2. Flood Forecast, Warning and Evacuation. This alternative reduces the risk of loss of life for the residents of the flood ravaged area, but does not reduce the human suffering incurred due to the trauma of the situation. The City of San Jose has a flood warning system in place in the Alviso area, directed towards flooding from Coyote Creek, the Guadalupe River and from San Francisco Bay.

4.2.2.3. Removal of Existing Structures from the Flood Plain. This alternative is extremely costly due to the large number of structures involved. Also, the area most severely impacted by flooding contains a sizable cohesive ethnic community, which would resist relocation. This plan is economically infeasible and socially unacceptable.

4.2.2.4. Combination Floodproofing Plan. A plan was developed to floodproof all of the buildings in the 100-year floodplain. All light industrial structures (117) would require a floodwall with an average to 1400 foot perimeter, and an average height of 3.5 feet, and four large and 6 small openings. One trailer park would be encircled by a floodwall. The structures in the community of Alviso (284) would be raised or relocated, depending on the condition of the structure. The total cost of the plan is estimated at about $45 million, and the annual cost is $3.9 million. Annual benefits were estimated at $3.6 million with a benefit cost ratio of .9; this plan was rejected.

4.2.2.5. Protecting Moveable, Damageable Property. Flood damage reduction is limited to property that can be moved or rearranged. When combined with a flood forecast, warning and evacuation system, the rearrangement of movable, damageable contents within flood prone structures provide a low cost nonstructural alternative.

4.2.2.6. Ring Levee. A low ring levee currently encircles the Alviso area in north San Jose, and reduces the frequency of flooding from small flood events. A ring levee around Alviso, with top elevation at 12.0 feet NGVD, was proposed by the Department of Public Works, City of San Jose, to provide that area with 100-year flood protection if no channel improvements were made to Coyote Creek. In addition, the ring levee would also provide 100-year protection against tidal flooding. The cost of this project was estimated to be $11,500,000. However, there is no funding available for project implementation at this time, and no prospects of funding in the near future. There is the potential that this could adversely impact the area upstream of Alviso, due to construction in the flood plain which could constrict overland flows and thereby produce a rise in the water surface. The Alviso ring levee is currently being addressed in the San Francisco Bay Shoreline Study by the Corps of Engineers, San Francisco District.

4.2.2.7. Summary of Nonstructural Measures. Of the several nonstructural measures studied, only the participation in flood insurance, flood forecast, warning and evacuation, and protecting moveable, damageable property are economically feasible and implementable for the entire flood plain. The ring levee around Alviso may also be implementable, but would only provide flood protection to that portion of the flood plain, leaving the remainder unprotected. In the rest of the flood plain, nonstructural alternatives only partially achieve the objective of flood damage prevention, since although damage to building contents and other movable property would be reduced, damage to the structures themselves and most business losses would still occur. Because the relocation of damageable property is a nonstructural measure in which the federal government could not participate, implementation would be the responsibility of local interests.

4.2.3. Impoundments

Impoundments involve the storage of excess floodwaters in a reservoir or an offstream impoundment area. On Coyote Creek, the existing Coyote Reservoir, Anderson Reservoir, and the Coyote Percolation Reservoir serve as water supply impoundments and aquifer recharge facilities. Although such impoundments have the capacity to reduce flood peaks through the storage of floodwaters, by late winter they are allowed to remain filled to assure the next year's water supply.

An additional dam and reservoir was proposed for Coyote Creek, upstream of Coyote Reservoir and downstream of the confluence with Los Osos Creek. This plan would provide for the storage of rainfall runoff from the upper watershed, but would also require channel improvements downstream. This plan was found to be economically infeasible.

Offstream storage in the lower Coyote Creek study area was also considered for floodwater management, but the high real estate values and the large amount of land necessary to accommodate the quantity of water involved would be excessively costly; therefore this was not a viable alternative.

4.2.4. Diversions

A concrete-lined channel was proposed to divert floodwaters from Coyote Creek, near Tennant Road, along the alignment of the West Valley Freeway to Canoas Creek, which empties into the Guadalupe River. This proposed plan would increase the volume of water flowing in the lower Guadalupe River, requiring a greater channel capacity than presently exists. The impact of induced flooding in the Guadalupe flood plain eliminated this alternative.

4.2.5. Channel Modification Plans

4.2.5.1. The Baylands Setback Levee Plan. This plan was developed to provide 100 year protection for Coyote Creek. The proposed plan consisted of offset levees constructed 600 feet apart along the Coyote. Analysis of this plan showed it to be economically unjustified.

4.2.5.2. The Lower Coyote Creek Levee and One Side Widening Plan. An array of channel improvement measures for the reach between Montague Expressway and Highway 237 were evaluated during the investigation of preliminary plans. These measures included a rock-lined channel, a widened earthen channel and a levee and one-side widening plan, which was the most cost-effective of the proposed plans. The Levee and One-Side Widening Plan proposed to provide 100-year flood protection by removing 2.6 linear miles of riparian vegetation along one bank of Coyote Creek. This plan was economically justified, although prorated over the four mile project length it was 40 percent more costly than the Alternate Sides Plan discussed in Section 4.4. Also, it was more destructive environmentally, and did not address the planning concern of the preservation of the riparian corridor for wildlife habitat, aesthetic quality and recreational values.

4.2.6. Formulation of Candidate Plans

Since the channel modification plan described in Section 4.2.5.2 was the only justified alternative, it was reformulated to decrease construction costs and adverse environmental impacts. Three channel modification plans were formulated for the final array of flood protection plans for Coyote Creek between Montague Expressway and the old Milpitas Sewage Treatment Plant, a distance of slightly over four miles. Each of these alternatives basically employs offset levees and earthen overflow channels, in different configurations, to provide flood protection to the affected communities in San Jose and Milpitas. The three proposed flood control alternatives are discussed in detail in Sections 4.4, 4.5 and 4.6.

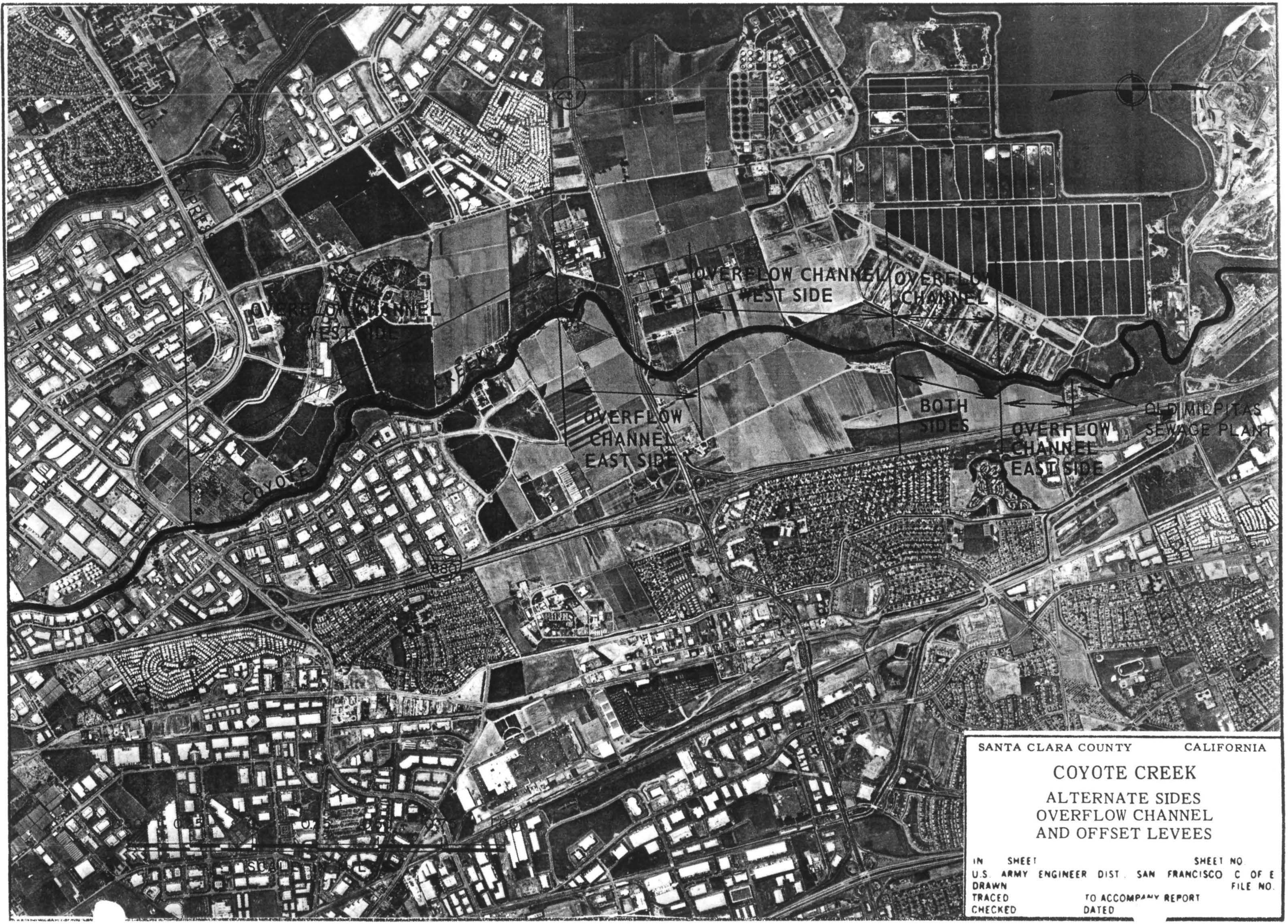
4.3. NO ACTION PLAN

This plan assumes that no future flood control project, structural or non-structural, would be implemented in the project area by the federal government. Those non-structural flood control alternatives already implemented will continue to be used (see Section 4.2.2). The Flood Disaster Protection Act of 1973 requires that local communities participate in the National Flood Insurance Program in order to continue to be eligible for financing through federally financed institutions; it is assumed that the cities of San Jose and Milpitas will continue to do so. The NFIP also specifies that participating communities require new development in the 100-year floodplain to be floodproofed; in the study area, floodproofing is most commonly accomplished by means of padded up foundations.

The Santa Clara Valley Water District has instituted a program of dedications for flood control under their Ordinance No. 83-2 which provides that, where equitable, the District will request dedication for flood control from landowners seeking a land use change. The alignment being dedicated has been dictated by existing development, bridges, available public lands, and negotiations between the Water District and local land owners structured around the equitability criteria of the Ordinance. Development of adjacent lands are dependent on these dedications; these dedications will occur regardless of the provision of flood control. The ordinance prevents construction of any permanent structures on the dedicated land. This land is being dedicated under the without (no action) project so as to maintain flexibility for flood control in this high hazard area before options are foreclosed."

This plan also assumes that the local sponsor will have constructed flood control levees in the reach north of the project area, between the old Milpitas Sewage Treatment Plant and Coyote Slough.

In the future, under the No Action Plan, the cities of Milpitas and San Jose would be expected to experience flooding of a similar frequency and intensity as in the past. Given the present channel capacity of Coyote Creek between Montague Expressway and the old Milpitas Sewage Treatment Plant, the area in the flood plain is subject to flooding from an event likely to occur approximately every thirteen years. The most


EXPRESSWAY
237
OVERFLOW CHANNEL WEST SIDE
COYOTE
CREEK
OVERFLOW CHANNEL EAST SIDE
OVERFLOW CHANNEL WEST SIDE
OVERFLOW CHANNEL
BOTH SIDES
OVERFLOW CHANNEL EAST SIDE
OLD MILPITAS SEWAGE PLANT
880

SANTA CLARA COUNTY CALIFORNIA

COYOTE CREEK

ALTERNATE SIDES
OVERFLOW CHANNEL
AND OFFSET LEVEES

IN SHEET SHEET NO.
U.S. ARMY ENGINEER DIST. SAN FRANCISCO C. OF E.
DRAWN FILE NO.
TRACED TO ACCOMPANY REPORT
CHECKED DATED

PLATE 4.1

objective of the plan is to establish riparian species over an area totalling approximately 32 acres. The 32-acre area would consist of six planting sites, all of which are located on project lands. Five of these sites are situated adjacent to the existing riparian corridor. The sixth site is between the overflow channel and the proposed levee, thus separated from existing vegetation.

The major goals of the revegetation are to: (1) reestablish mid- and upper-terrace riparian vegetation adjacent to the remaining riparian vegetation; (2) reintroduce species which are presently either totally lacking or under-represented, thus adding to the plant diversity; and (3) replace lost wildlife habitat, such as foraging areas, nesting sites, cover and perches. The goal is to achieve 100 % compensation of habitat losses.

The mitigation sites, either presently under cultivation or fallow agricultural land, have been identified as suitable for the establishment of riparian vegetation. The vegetation planted would be allowed to develop into mature riparian forest, with an understory of native shrubs and groundcovers. In addition, the planting program would include using shrubs and groundcovers to revegetate portions of the four areas where the overflow channel crosses over the existing channel. The goal of this crossover revegetation is to develop a riparian substory to facilitate movement of small mammals, reptiles and amphibians through the breaks in the riparian corridor.

One of the riparian planting sites would be monitored annually for both vegetation planting success and wildlife use for a minimum of ten years after initial planting, and then at year 15 and at 10-year intervals thereafter for the life of the project. The remaining five sites would be monitored for vegetation success and wildlife use every five years for the first 15 years, and at 10-year intervals thereafter for the life of the project.

4.4.3. Plan Economics

4.4.3.1. Project Benefits. The economic benefits associated with a flood control project accrue over the life of the proposed project, which is assumed to be 100 years. The total benefits are then converted to an average annual equivalent (a.a.e.), using the discount rate announced each year by the U.S. Water Resources Council for federal projects. For fiscal year 1986 (October 1, 1985 to September 30, 1986) the discount rate is 8-5/8 percent.

The residual floodplain for a study area includes that portion of the floodplain which would experience some flooding from an extreme flood event even if a flood control project were constructed. The residual floodplain for Coyote Creek is shown on Plate 3.3. The average annual benefits for flood protection to current urban development for residential, commercial/industrial, public buildings and mobile homes are determined by subtracting the residual average annual damages from the existing average annual damages related to the event for which flood protection is provided. The average annual benefits for current development including structures, contents and mobile homes are shown in Table 4.1.

The total average annual benefits for this flood control plan for Coyote Creek amount to $5,087,000 for a project providing a 100-year level of protection, $3,523,000 for a 50-year level of protection and $5,483,000 for a 500-year level of protection. The various categories of flood protection benefits that were taken into account for Coyote Creek included urban properties, structures and contents (present and future increments), mobile homes, automobiles, business losses, location benefits and development cost savings, and savings in current maintenance costs, flood insurance administrative costs and emergency aid. These benefits are itemized in Table 4.2.

4.4.3.2. Project Costs. The costs incurred in the construction of a federal flood control project include the cost of construction materials and labor, final engineering and design, contractor mobilization and demobilization and supervision and administration charges for the actual construction. Real estate cost estimates are comprised of the actual costs of purchasing real estate, including acquisition costs, and the relocation expenses required to provide relocation assistance to residents and businesses displaced by the proposed project.

For the Alternate Sides Plan, all rights-of-way are expected to be dedicated as a floodway to reduce the potential hazard from levee breaks and for flood control prior to project year one, even under without project conditions, and therefore the rights-of-way costs reflect the value of that resoruce dedicated, and its agricultural value under the without project condition. The resource commitment will be identical under the without project and Alternative Sides Plan conditions.

Total estimated costs for the implementation of the Alternate Sides Overflow Channel and Offset Levee Plan are $29,930,000 for an alternative providing 100-year protection on Coyote Creek. These costs are shown in detail in Table 4.3. Costs for 50-year and 500-year levels of protection are $27,794,000 and $45,930,000, respectively.

The total costs on an average annual basis were computed using a discount rate of 8-5/8 percent and a project life of 100 years. Operations and maintenance costs total approximately one percent of the construction costs, excluding real estate. These costs include channel and levee maintenance, and costs associated with wildlife monitoring and mitigation area maintenance. The average annual cost (a.a.c.) of implementing this flood control plan for Coyote Creek is $3,148,000 for the 100-year alternative.

4.4.3.3. Economic Optimization. The purpose of this section is to determine the optimal level of flood protection associated with the proposed plan. To achieve economic optimization, a comparison is made of the average annual benefits and annual average costs of implementation for the various levels of protection of a proposed plan. The greatest net benefits for this plan are for flood protection from an event expected to occur at least once every 100 years. Subsequent discussions of this plan are directed only to this level of protection unless otherwise stated. The net benefits for this alternative, on an average annual basis, are $1,939,000. The economic optimization for this plan is presented in Table 4.4, and displayed graphically in Figure 4.1

4.4.3.4. Benefit/Cost Ratio. The ratio of the average annual benefits to average annual costs, computed using a project life of 100 years and a discount rate of 8-5/8 percent, was determined to be 1.6 for this plan ($5,087,000/$3,148,000)

4.4.4. Plan Impacts

The implementation of this flood control plan would cause both adverse and beneficial impacts to the environmental resources in the study area. All of the project impacts are discussed at length in Section Seven. Significant impacts to environmental resources are shown in Table 4.6.

Adverse physical and biological impacts of this proposed plan are that it would cause the loss of 13.6 acres of riparian habitat along Coyote Creek, or approximately 15 percent of the total number of trees, which would reduce the amount and quality of nesting, feeding and resting habitat for wildlife, and in turn reduce wildlife abundance. There would be 18 permanent breaks in the riparian corridor, which might reduce or eliminate species unable to cross barriers of open space. The water temperature would increase slightly at breaks in the riparian corridor, but this would not significantly degrade the quality of the fish and benthic-organism habitat. Mitigation would be included in this plan to compensate for the identified adverse impacts.

Impacts to the socio-cultural environment would include degradation of the area's aesthetic quality and scenic values. Planting of riparian vegetation for beautification purposes is proposed to offset these impacts. A day-use facility of Agnews State Hospital, consisting of several small buildings and recreational equipment and known as Camp Coyote, is within the project right-of-way. The proposed relocation of this facility is a local responsibility under LERRD. In addition, several structures which may possess historical and architectural significance would be impacted by the plan.

Under this alternative there would be beneficial effects to fish and wildlife resources. Because this proposed flood control plan involves a reduction in current channel maintenance practices, there would be a relative increase in the amount of vegetation and snags that occur near the streambed. Another benefit to wildlife would be the conversion of existing upland or agricultural land to floodway habitat as a result of the overflow channel alignment. Additionally, with implementation of the riparian mitigation plan (Section 4.4.2.) the salt marsh yellowthroat (listed as a candidate species by the U.S. Fish and Wildlife Service) would benefit by establishment of new habitat near the Creek. In addition, a system of hiking and biking trails and related amenities has been considereded for incorporation into the plan at a latter date. This would provide aesthetic quality and recreational values, thus benefiting the public.

4.5. SAME SIDE OVERFLOW CHANNEL AND OFFSET LEVEES PLAN

4.5.1. Plan Description

The basic objective of this plan is to reduce flood damages in the cities of San Jose and Milpitas, and to enhance the riparian corridor of Coyote Creek for wildlife habitat, aesthetic quality and recreational values. The flood damage reduction would be accomplished by providing an overflow channel to accommodate the floodwaters, and offset earthen levees. The overflow channel would be located on one side of the Creek, between breaks under the major highways. Some of the lands necessary for the implementation of this alternative have been dedicated as flood control rights-of-way. Approximately 260 acres of dedicated-floodway land will be required for this alternative. In addition, approximately 61.9 acres, which would develop to light industrial uses without a project, would be required for this alignment and would therefore be purchased at a cost of about $20.8 million. This plan is shown on Plate 4.2.

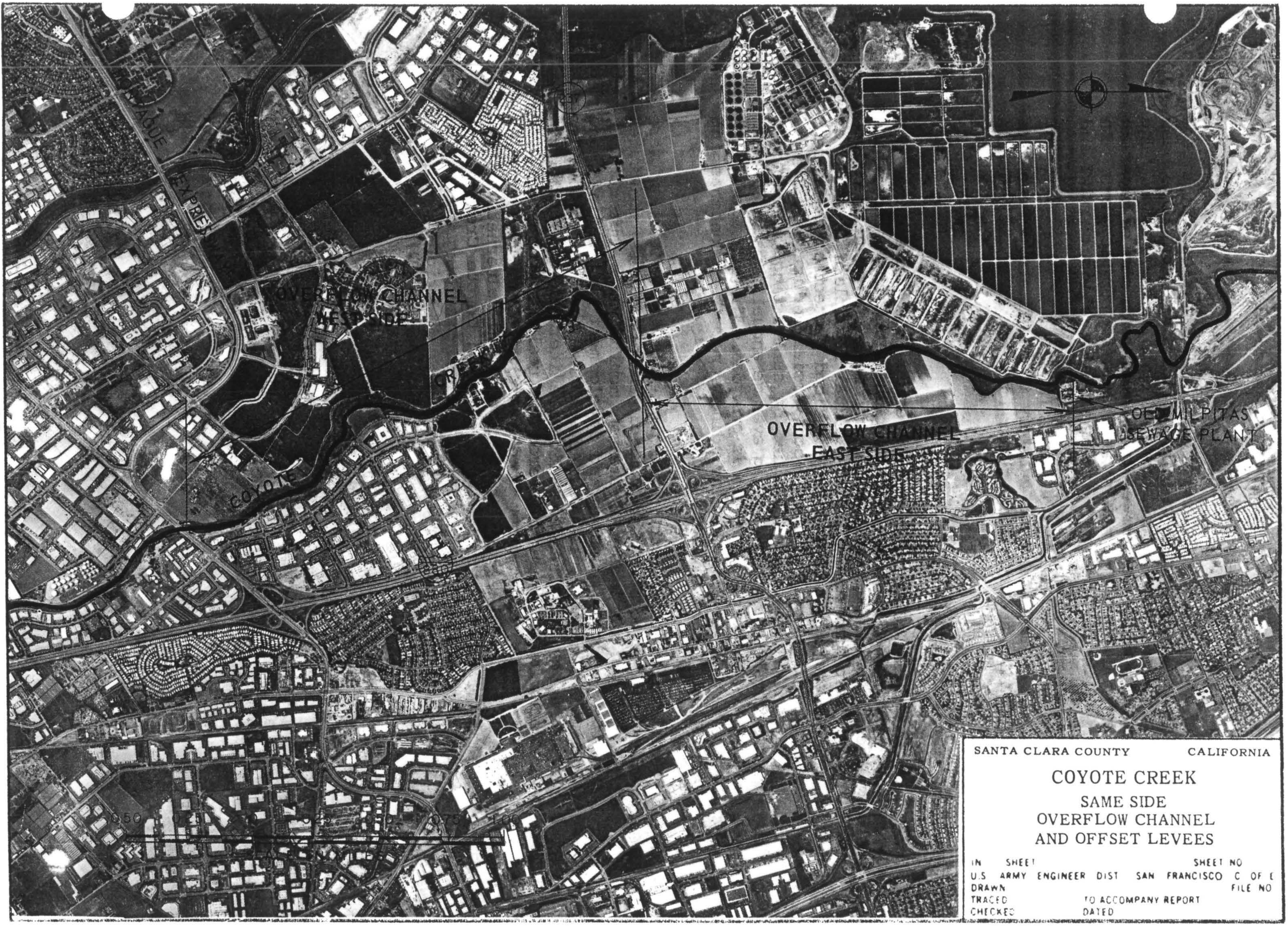
From Montague Expressway heading downstream, this alternative would feature an overflow channel and offset levee on the west side of the creek, to approximately 500 feet south of the property line between the State of California and the River Oaks Associates. For the next 850 feet, a floodwall would replace the west levee. On the east side of the creek, an offset levee would be constructed from Montague Expressway to approximately 40 feet downstream of the Prudential Insurance Company property, where an exterior augmentation to the existing levee would be constructed to the property line of Peery & Arrillaga and McCarthy.

The overflow channel and offset levee would continue on the west side of the Creek to the Highway 237 rock-lined transition. Below the transition, the overflow channel and offset levee would be on the east side of the Creek, and terminate at the old Milpitas Sewage Treatment Plant.

In the overflow channel, the bottom of the proposed excavated bench would average five feet in height above the existing channel bottom, allowing the low flows to be contained within the natural Coyote Creek channel and riparian corridor.

4.5.2. Mitigation Measures

A mitigation plan was developed for this flood control alternative to provide full compensation of fish and wildlife habitat losses. The objective of the plan is to establish riparian species over an area totalling approximately 20 acres. The 20-acre area would consist of five planting sites, all of which are located on project lands. Four of these sites are situated adjacent to the existing riparian corridor. The fifth site is between the overflow channel and the proposed levee, thus separated from existing vegetation. The mitigation plan goals, planting methods, and monitoring of wildlife use and planting success would be



SANTA CLARA COUNTY CALIFORNIA

COYOTE CREEK

SAME SIDE
OVERFLOW CHANNEL
AND OFFSET LEVEES

IN SHEET SHEET NO
U.S ARMY ENGINEER DIST SAN FRANCISCO C OF E
DRAWN FILE NO
TRACED TO ACCOMPANY REPORT
CHECKED DATED

PLATE 4.2

identical to those outlined in Section 4.4.2. The mitigation sites, either presently under cultivation or fallow agricultural land, have been identified as suitable for the establishment of riparian vegetation. The vegetation planted would be allowed to develop into mature riparian forest, with an understory of native shrubs and groundcovers. In addition, the planting program would include using shrubs and groundcovers to revegetate portions of the four areas where the overflow channel crosses over the existing channel. The goal of this crossover revegetation is to develop a riparian substory to facilitate movement of small mammals, reptiles and amphibians through the breaks in the riparian corridor.

4.5.3. Plan Economics

4.5.3.1. Project Benefits. The residual floodplain for the Coyote Creek study area includes that portion of the floodplain which would experience some flooding from an extreme event even if a flood control project were constructed. The residual floodplain is shown on Plate 3.3. The average annual benefits for flood protection to current urban development for residential, commercial/industrial, public buildings and mobile homes are determined by subtracting the residual average annual damages from the existing average annual damages related to the event for which flood protection is provided. The average annual benefits for current development including structures, contents and mobile homes are shown in Table 4.1.

The various categories of flood protection benefits that were taken into account for Coyote Creek included urban properties, structures and contents (present and future increments), mobile homes, automobiles, business losses, location benefits and development cost savings, and savings in current maintenance costs, flood insurance administrative costs and emergency aid. These benefits are itemized in Table 4.2. Additional location benefits are considered for real estate parcels that have been permanently dedicated for flood control rights-of-way, and that would not be needed with the implementation of this alternative. The total benefits for flood control improvements on Coyote Creek, on an average annual basis, are $5,352,000 for a project providing a 100-year level of protection, including $265,000 for additional location benefits. Alternatives providing 50-year and 500-year levels of protection from flooding have benefits of $3,918,000 and $5,748,000, respectively.

4.5.3.2. Project Costs. Total costs for the implementation of the Same Sides Overflow Channel and Offset Levees Plan are $48,613,000 for a project providing 100-year flood protection. Costs for the 50-year and 500-year alternatives are $39,436,000 and $64,613,000, respectively.

The average annual cost was computed using the discount rate of 8-5/8 percent and a project life of 100 years. Operations and maintenance costs total about one percent of the construction costs, excluding real estate. The average annual cost for the 100-year alternative is $4,728,000.

4.5.3.3. Economic Optimization. The definition of economic optimization is given in Section 4.4.3.3. A comparison was made of the average annual benefits and average annual costs of implementation of each level of protection of this proposed plan. The greatest net benefits for this plan are for the alternative which would provide a 100-year level of flood protection. Subsequent discussions of this plan are directed only to this level of protection unless otherwise stated. The net benefits for this alternative, on an average annual basis, are $624,000. The economic optimization is shown in Table 4.4, and displayed graphically in Figure 4.2.

4.5.3.4. Benefit/Cost Ratio. The ratio of the average annual benefits to average annual costs was determined to be 1.1 for this proposed alternative ($5,352,000/$4,728,000).

4.5.4. Plan Impacts

The implementation of this flood control plan would cause both adverse and beneficial impacts to the significant resources in the study area. All of the project impacts are discussed at length in Section Seven. Significant impacts to environmental resources are shown in Table 4.6.

Adverse impacts of this proposed plan are that it would cause the loss of 5.6 acres of riparian habitat along Coyote Creek, or approximately six percent of the total number of trees, which would reduce the amount and quality of nesting, feeding and resting habitat for wildlife. There would be nine permanent breaks in the riparian corridor, which might reduce or eliminate species unable to cross this barrier of open space. The water temperature would increase slightly at the breaks in the riparian corridor, but this is not expected to significantly impact fish and benthic organim habitat. Impacts to the socio-cultural environment would include degraded aesthetic quality and scenic values. Historic resources would be removed at one site. Mitigation would be included in this plan to compensate for adverse environmental impacts.

Beneficial impacts of this alternative are much the same as those of the other flood control alternatives. They would include a relative increase in snags and vegetation near the streambed due to the reduction in current channel maintenance practices and the conversion of upland and agricultural land to floodway habitat. Hiking and biking trails and related amenities would be incorporated into the plan, which would provide aesthetic quality and recreational values.

4.6. COMBINATION OVERFLOW CHANNEL AND OFFSET LEVEES PLAN

4.6.1. Plan Description

This plan would utilize the design of the Same Side Plan, with the overflow channel and offset levee on the west side of the creek, from Montague Expressway to Highway 237. The 260 acres of dedicated-floodway land will be required for this project. In addition, approximately 14.1 acres, which would develop to light industrial uses without a project, would be required for this alignment and would therefore be purchased at a cost of over $8.8 million.

From Montague Expressway heading downstream, this alternative plan would feature an overflow channel and offset levee on the west side of the creek, to approximately 500 feet south of the property line between the State of California and the River Oaks Associates. For the next 850 feet, a floodwall would replace the west levee. On the east side of the creek, an offset levee would be constructed from Montague Expressway to approximately 40 feet downstream of the Prudential Insurance Company property, where an exterior augmentation to the existing levee would be constructed to the property line of Peery & Arrillaga and McCarthy.

The overflow channel and offset levee would continue on the west side of the Creek to immediately upstream of Highway 237, where a rock lined transition would lead into a trapezoidal concrete channel under the Highway 237 bridge, and lead out again downstream. Downstream of Highway 237 to the old Milpitas Sewage Treatment Plant, the plan would be identical to the Alternate Sides Plan. North of Highway 237, the overflow channel would cross from the east to the west side, and back again before terminating at the old Milpitas Sewage Treatment Plant. This plan is shown on Plate 4.3.

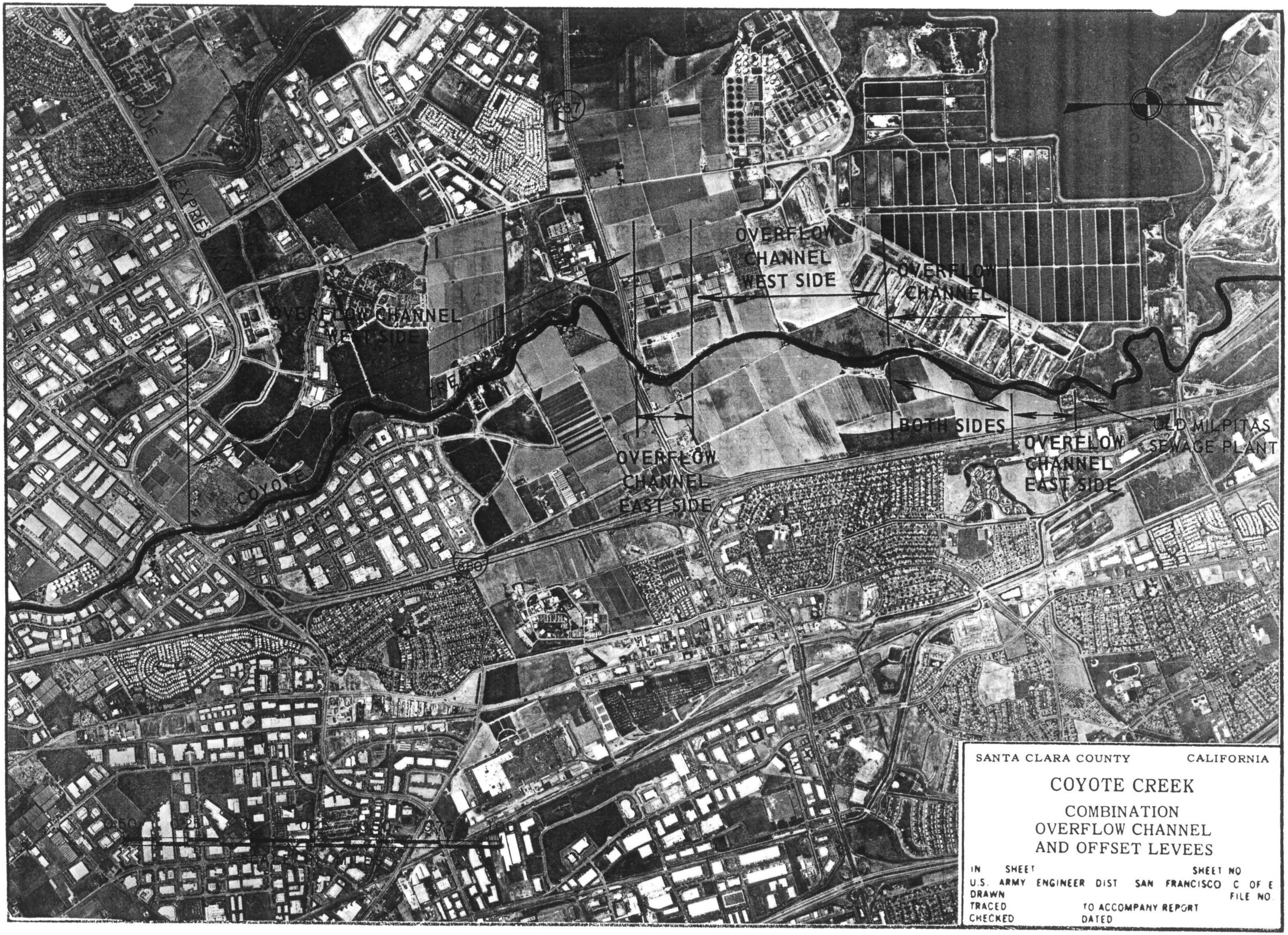
4.6.2. Mitigation Measures

The mitigation plan for this proposed flood control plan, like the Same Side Plan described above, is an adaptation of the mitigation plan developed for the Alternate Sides Plan. For this alternative, the riparian corridor revegetation program would establish riparian vegetation over an area that totals approximately 26 acres, as well as provide a riparian substory at the overflow channel crossovers. The mitigation plan goals, planting methods and monitoring of planting success and wildlife use would be identical to those outlined in Section 4.4.2.

4.6.3. Plan Economics

4.6.3.1 Project Benefits. The residual floodplain for the Coyote Creek study area includes that portion of the floodplain which would experience some flooding from an extreme flood event even if a flood control project were constructed. The residual floodplain is shown on Plate 3.3. The average annual benefits for flood protection to current urban development for residential, commercial/ industrial, public buildings and mobile homes are determined by subtracting the residual average annual damages from the existing average annual damages related to the event for which flood protection is provided. The average annual benefits for current development including structures, contents and mobile homes are shown in Table 4.1.

The various categories of flood protection benefits that were taken into account for Coyote Creek included urban properties, structures and contents (present and future increments), mobile homes, automobiles, business losses, location benefits and development cost savings, and savings in current maintenance costs, flood insurance administrative costs and emergency aid. These benefits are itemized in Table 4.2. Additional location benefits are considered for real estate parcels that have been permanently dedicated for flood control rights-of-way, and that



AGUE
EXPRES
237
OVERFLOW CHANNEL WEST SIDE
OVERFLOW CHANNEL WEST SIDE
OVERFLOW CHANNEL
CREE
COYOTE
OVERFLOW CHANNEL EAST SIDE
BOTH SIDES
OVERFLOW CHANNEL EAST SIDE
OLD MILPITAS SEWAGE PLANT
880
0.50
0.25
0
0.25
0.50
0.75
1

SANTA CLARA COUNTY CALIFORNIA

COYOTE CREEK

COMBINATION OVERFLOW CHANNEL AND OFFSET LEVEES

IN SHEET SHEET NO
U.S. ARMY ENGINEER DIST SAN FRANCISCO C OF E
DRAWN FILE NO.
TRACED TO ACCOMPANY REPORT
CHECKED DATED

would not be needed with the implementation of this alternative. The total project benefits for Coyote Creek, on an average annual basis, amount to $5,104,000 for a project providing a 100-year level of protection against flooding, including $17,000 in additional location benefits. For alternatives providing 50-year and 500-year levels of protection, the benefits are $3,665,000 and $5,500,000, respectively.

4.6.3.2. Project Costs. Total costs for the implementation of a 100-year flood protection alternative of the proposed Combination Overflow Channel and Offset Levees Plan for Coyote Creek are $38,518,000. Costs for alternatives providing 50-year and 500-year levels of protection are $35,341,000 and $54,518,000, respectively.

The total project costs on an average annual basis were computed using the discount rate of 8-5/8 percent and a project life of 100 years. Operations and maintenance costs total approximately one percent of the construction costs, exclusive of real estate costs. The average annual cost (a.a.c.) for the 100-year alternative is $3,883,000.

4.6.3.3. Economic Optimization. The definition of economic optimization is given in Section 4.4.3.3. The greatest net benefits occur with the 100-year flood protection alternative. Subsequent discussions of this plan are directed only to this level of protection unless otherwise stated. The net benefits for this alternative, on an average annual basis, are $1,221,000. The economic optimization is given in Table 4.4, and displayed graphically in Figure 4.3.

4.6.3.4. Benefit/Cost Ratio. The ratio of the average annual benefits to average annual costs was determined to be 1.3 for this alternative plan ($5,104,000/$3,883,000).

4.6.4. Plan Impacts

The implementation of this flood control plan would cause both adverse and beneficial impacts to the significant resources in the study area. All of the project impacts are discussed at length in Section Seven. Significant impacts to environmental resources are shown in Table 4.6.

Adverse impacts of this proposed plan are that it would cause the loss of 9.5 acres of riparian habitat along Coyote Creek, or approximately ten percent of the total number of trees, which would reduce the amount and quality of nesting, feeding and resting habitat for wildlife. There would be 15 permanent breaks in the riparian corridor, which might reduce or eliminate species unable to cross barriers of open space. Impacts to the socio-cultural environment would include degraded aesthetic quality and scenic values. Historic resources would be removed at three sites. Mitigation would be included in this plan to compensate for adverse environmental impacts.

Beneficial impacts of this alternative are much the same as those of the other flood control alternatives. They would include a relative increase in snags and vegetation near the streambed due to the reduction in current channel maintenance practices and the conversion of upland and agricultural land to floodway habitat. Hiking and biking trails and related amenities would be incorporated into the plan, which would provide aesthetic quality and recreational values.

4.7. COMPARISON OF ALTERNATIVE PLANS

4.7.1. System of Accounts

The System of Accounts is a method by which the positive and negative effects of the various proposed flood damage prevention plans are identified. This system, as suggested by the U.S. Water Resources Council, utilizes the accounts to compare long term environmental, economic and other impacts. The categories of accounts are defined such that each proposed plan can be compared equitably to any other plan, and to the future conditions with the No Action plan, as required by NEPA. The categories of accounts include National Economic Development (NED), Environmental Quality (EQ), Regional Economic Development (RED), and Other Social Effects (OSE).

4.7.1.1. National Economic Development (NED). The proposed flood control alternatives are compared to future conditions without a plan (No Action), in terms of national economic development, to identify their beneficial or adverse effects on the national economy. Beneficial effects are defined as the increases in the economic value of the national output of goods and services that can be attributed to a plan. Adverse NED effects include the loss of investment opportunities due to the implementation of a flood control plan. The national economic development plan is the one that maximizes the net economic benefits, that is, the plan with the greatest difference between the average annual benefits and the average annual costs.

All three of the flood protection plans for Coyote Creek were formulated to address the flood control objective equally. Each of the plans achieved economic optimization by providing 100-year protection against flooding from Coyote Creek. The three optimum alternatives are therefore equivalent in reducing flood damage to properties and the resultant human suffering. They also meet the objective of reducing construction costs in the Rincon de Los Esteros redevelopment area. The plan with the greatest net benefits to national economic development is the Alternate Sides Plan.

4.7.1.2. Environmental Quality. The EQ account addresses the significant impacts of the proposed flood control plans on environmental resources and other environmental characteristics. Significant physical and biological resources and other environmental characteristics are defined in Sections 6.5.1 and 6.5.2. The impacts of the proposed flood control plans on significant environmental resources are compared to future conditions in the absence of a plan (No Action) in Table 4.6.

Implementation of any of the flood control alternatives would cause loss of wildlife habitat due to removal of riparian vegetation, which is considered a significant impact. There would not be significant effects on fisheries or fish habitat, air and water quality, or the future hydrology of Coyote Creek. Mitigation for adverse effects on the riparian vegetation is well addressed by all plans. The Alternate Sides Plan, with approximately 32 acres of land proposed for replanting with riparian trees and understory shrubs and groundcover, has the greatest mitigation area for replacement of habitat, followed by the Combination Plan with about 26 acres and the Same Side Plan with approximately 23 acres. In the preservation of the riparian corridor, the Same Side Plan is the most environmentally responsive, followed by the Combination Plan and Alternative Sides Plan.

4.7.1.3. Regional Economic Development. The RED account is used to define the effects that the proposed flood control plans could have on regional economics, specifically regional employment and income. Those resources, defined in Section 6.5.4, which are considered to affect regional economic development in the San Jose/Milpitas area, and on which the proposed flood control plans are expected to have significant impacts, are included in the RED account. The possible effects of the proposed plans on regional economic resources, as compared to future conditions with the No Action Plan, are shown in Table 7.1.

4.7.1.4. Other Social Effects. Included in the OSE account are areas of possible significant impacts to the socio-cultural environment, as defined in Section 6.5.3. The OSE account typically includes significant community impacts in the areas of quality of life, public health and safety, displacement of people, long term productivity and energy use.

For Coyote Creek, significant resources likely to be impacted by the proposed flood control alternatives include an historic archaeological site and two historic buildings. On the Agnews State Hospital property, the Camp Coyote facility would require relocation. The construction of flood control levees and the removal of riparian vegetation would severely impact the aesthetic quality of the riparian corridor. Beneficial effects to the planned city and county trial system would be realized as the project levees will be available for trail alignment, thus facilitating a continuous system in accordance with the Lower Coyote Creek Park Chain Master Plan. A comparison of the impacts of the proposed plans with the future condition without a plan (No Action) is given in Table 7.1.

4.7.2. Associated Evaluation Criteria

Four criteria were considered in the evaluation of the final array of plans for Coyote Creek. These criteria, suggested by the U.S. Water Resources Council, are Completeness, Effectiveness, Efficiency and Acceptability. Completeness is a determination as to whether the proposed plan contains all the elements necessary to achieve the objectives of the plan. Effectiveness is defined as the extent to which the objectives of the proposed plan are achieved. Efficiency is the cost effectiveness of the plan, in terms of net benefits. Acceptability is defined as the degree of acceptance that the plan receives by the concerned public. The associated evaluation criteria for the candidate plans are shown in Table 4.7.

4.8. TRADE-OFF ANALYSIS AND PLAN SELECTION

4.8.1. Trade-off Analysis

Trade-offs are utilized as a technique to evaluate the proposed flood control alternatives for Coyote Creek. At the first level of comparison, the trade-offs to be considered are between the No Action plan and the three candidate flood control alternatives. Each plan is evaluated as to the achievement of the planning objectives and the economic benefits related to the action alternatives, versus the project costs and adverse environmental impacts associated with these alternatives.

The three action candidates rank higher than the No Action alternative in meeting the planning objectives of this investigation, which are reduction in flood damages, reduction in construction costs in the redevelopment area, and the incorporation of the trail system and other recreational amenities on the east levee along Coyote Creek. The No Action plan ranks highest of the plans considered in minimizing adverse impacts to significant environmental resources in the Coyote Creek riparian corridor. All three of the action alternatives rank higher in terms of national economic development (NED) than the No Action alternative. In order to achieve positive net benefits, the proposed flood control alternatives incur construction costs, which the No Action plan does not. The economic and environmental costs associated with the action alternatives must be incurred in order to attain the planning objectives.

At the next level, the trade-offs are between the three proposed action alternatives. Since all three alternatives achieve the planning objectives of the study equally, by providing the same level of protection against flooding from Coyote Creek with the attendant benefits, the project costs and environmental impacts are the only factors in these trade-offs. The Alternate Sides Plan has the lowest project cost, but the highest degree of associated adverse environmental impacts, of the three alternatives. The Same Side Plan has the least environmental impacts, but implementation costs are more than double those of the Alternate Sides Plan. The Combination Plan falls somewhere in the middle of the other two plans as to project costs and adverse environmental impacts.

4.8.2. Rationale for Designation of National Economic Development Plan

The NED plan is the one which maximizes the net national economic development benefits, consistent with the Federal objective. The NED plan is the plan which provides the greatest difference between the average annual benefits and the average annual costs, thereby contributing the most to national economic development. All three of the flood protection plans for Coyote Creek were formulated to address the flood control objective equally. The three optimum alternatives are equivalent in reducing flood damage to properties, structures and contents, and in the achievement of other flood protection benefits. A comparison of the net benefits of the three candidate flood control plans show the Alternate Sides Overflow Channel and Offset Levee Plan as the one having the greatest net economic benefits. Included in the plan are features intended to compensate for associated adverse environmental impacts. Therefore, the Alternate Sides Overflow Channel and Offset Levee Plan is designated as the National Economic Development plan.

4.8.3. Rationale for Designation of Recommended Plan

The evaluations of the three candidate plans in the System of Accounts and the Associated Evaluation Criteria in Section 4.7 has shown that the Alternate Sides Plan is the NED plan and achieves all of the planning objectives established for this investigation. Therefore, the Alternate Sides Overflow Channel and Offset Levee Plan is designated as the recommended plan.

4.9. RECOMMENDED PLAN

4.9.1. Detailed Description

The Alternate Sides Plan would feature an overflow channel and offset levees set approximately 400 to 900 feet apart. The levees would vary between four and nine feet in height, with a top width of 18 feet, and side slopes of 3H to 1V (three feet horizontal to one foot vertical) on the inboard side, and 2H to 1V on the outboard side. An all-weather patrol road would be constructed on the crown of the project levee for purposes of inspection, maintenance and flood fighting. An effective width of 15 feet is required for the local sponsor's oversized, heavy equipment. Because the patrol road would be adequate for vehicle passing, turnouts will not be provided. The width of the overflow channel would vary with geological and hydrological conditions. The hydrology and hydraulic criteria which were used in the design of the flood control plan for Coyote Creek are shown in Table 4.5.

Beginning in the upstream reach, a rock lined transition would lead out from Montague Expressway bridge culvert, for a distance of 200 feet. The overflow channel alignment would be on the west side of the creek, from Montague Expressway heading downstream to approximately 500 feet south of the property line between the State of California and the River Oaks Associates, a distance of 4,170 linear feet. For the next 850 feet, a floodwall would replace the west levee. On the east side of the creek, approximately 5,600 feet of offset levee would be constructed from Montague Expressway to approximately 40 feet downstream of the Prudential Insurance Company property. An exterior augmentation to the existing levee would be constructed to the property line of Peery & Arrillaga and McCarthy, a distance of about 4,300 feet. Downstream of the property line of Peery & Arrillaga and McCarthy, an 800 foot riprap lined channel alignment would replace the meander in the natural channel, and the overflow channel would cross over the Creek to the east side at this alignment. The bottom of the excavated bench would average five feet in height above the existing channel bottom. This would allow the low flows to be contained within the natural Coyote Creek channel. A rock-lined transition would lead into a trapezoidal concrete channel under the

APPENDIX B

JURISDICTIONAL WATERS AND WETLAND REPORT
COYOTE CREEK--REACH 3
SANTA CLARA, CALIFORNIA

Contents

Section Page

Summary **B-1**

1.0 Description of Project **B-2**

2.0 Purpose of the Wetland Delineation **B-3**

3.0 Environmnetal Setting **B-3**

4.0 Methods **B-3**
4.1 Hydrological Modeling of the Ordinary High Water Line B-4
4.2 Field Investigation of the Main Creek Channel B-4
4.3 Field Investigation of the Excavated Depressions B-5

5.0 Results **B-6**
5.1 Water and Wetland Determination and Delineation B-6
5.2 Wetland Functions and Values B-10

6.0 Discussion **B-10**
6.1 Project Impacts B-10
6.2 Regulatory Requirements B-11

7.0 Conclusions **B-12**

8.0 Citations **B-12**

Tables

Number **Page**

B-1 Summary of Wetlands and Water Types Within Reach 3A and Reach 3B of the Coyote Creek Flood Control Project Area B-14
B-2 Summary of Impacts to Jurisdictional Areas and Wetlands within each Reach B-15
B-3 Summary of Impacts to Wetlands and Waters by Proposed Activity B-16
B-4 Plant Species Observed During Wetland Field Surveys of Reach 3 of Coyote Creek B-17

Figures

B-1 Limit of Reaches 3A and 3B of Coyote Creek
B-2 Limit of Jurisdicitonal Waters and Wetlands at the Crossover Area
B-3 Limit of Jurisdictional Waters and Wetlands at SR 237
B-4 Limit of Jurisdictional Waters and Wetlands at Montague Expressway
B-5 Wetlands Impacts in Reach 3 at the Crossover Area
B-6 Wetlands Impacts in Reach 3 at SR 237
B-7 Wetlands Impacts in Reach 3 at Montague Expressway
B-8 General Map of the Drainage Basin, Coyote Creek

Attachment A Data Forms for Jurisdictional Delineation of Wetlands and Waters
Attachment B Maps of Jurisdictional Areas and Sampling Points (Plates 1-6)
Attachment C USGS Quadrangle Map

Appendix B
Jurisdictional Wetlands and Waters Report

Summary

A delineation of jurisdictional wetlands and waters was conducted along Reach 3 of Coyote Creek Santa Clara Valley Water District (Water District) from a location just downstream of SR 237, and extending to just north of the Montague Expressway bridge crossing. A total of approximately 21 acres of jurisdictional wetlands and waters of the United States was identified within the 220-acre study area (Table B-1). Jurisdictional wetlands and waters occurred primarily within the banks of the creek. Other jurisdictional wetlands identified within the project area consist of portions of two man-made excavations west of the creek near SR 237, and one seasonal wetland outside of the eastern levee near Bellew Drive. The project area is divided into two parts: Reach 3A and Reach 3B. Reach 3A includes a realigned section of the creek and levees and an overflow channel from the approximate location of the future Tasman Drive crossing to SR 237. Proposed activities within Reach 3B are construction of transition structures (concrete and rock-lined channel areas) beneath and adjacent to the two bridge crossings, as well as levees and an overflow channel from Montague Expressway to Tasman Drive.

Coyote Creek's wetlands are formed at the edge of the low-flow water line and extend varying distances upslope toward the existing levees. The width of wetlands is largely controlled by the steepness of the levee banks; where the banks are less steep, wetlands occur as a band up to 15 feet wide, where the banks are very steep, wetlands occur only as narrow band (1 to 2 feet wide). Dominant plant species observed within these wetland areas were riparian canopy species (e.g., cottonwood and box elder), with an herbaceous understory dominated by spreading bentgrass, rough cockleburr, and fragrant goldenrod. The seasonal wetland east of the levee near Bellew Drive has formed in a poorly drained area apparently disturbed by recent construction and demolition activities. This wetland is just outside the project area. Portions of two depressions formerly excavated for borrow material on the west side of Reach 3A support seasonal wetland vegetation communities and pond water during rainy periods when no drainage can occur. Referred to in this application as excavated depressions, the north excavated depression was sparsely vegetated, with only scattered marsh heather, russian thistle, and rabbitsfoot grass present; the south excavated depression was completely vegetated with herbaceous species such as salt grass, seaside heliotrope, wild radish, willows, and milk thistle.

Since flood control improvements are generally avoiding the existing creek corridor, they would directly affect jurisdictional waters and wetlands only near the two ends of the project. The jurisdictional area to be affected directly in Reach 3 totals 4 acres of which 1.6 acres are wetlands (Table B-2). Within Reach 3A, the proposed crossover structure would replace approximately 900 linear feet of meandering creek channel with 630 linear feet of a straightened channel. Also within Reach 3A, approximately 300 feet of channel would be lined with rock near the SR 237 bridge. This corresponds to a direct

loss of approximately 1.4 acres of jurisdictional area total for Reach 3A in Coyote Creek, up to 0.4 acres of which are wetlands. Also within Reach 3A, proposed construction of the new west levee would directly fill up to 0.5 acres of wetlands within the two excavated depressions. Excavation of the adjacent overflow channel would cause approximately 0.2 acres of one depression to be excavated deeper, and could indirectly affect an additional 1.2 acres by altering the local hydrology.

Proposed construction activities within Reach 3B would impact approximately 2.1 acres of jurisdictional wetlands and waters near the Montague and SR 237 bridges. Approximately 0.7 acres of this area is considered to be wetlands (see Table B-3).

Mitigation for impacts to riparian habitat within Reach 3 has been proposed as part of the entire lower Coyote Creek flood control program for Reaches 1 through 3 from San Francisco Bay to Montague Expressway. The size and type of the riparian mitigation program is based on a Habitat Evaluation Procedure (HEP) analysis performed by the U.S. Fish and Wildlife Service as part of the 1988 Feasibility Report/Environmental Impact Statement (FR/EIS) for that project. Measures to mitigate for loss of riparian habitat and wetlands areas are described in the FEIS and a 1993 Final Environmental Assessment (FEA) for the Coyote Creek flood control program for Reaches 1 through 3. Reaches 1 and 2 have been previously permitted and constructed. This application is restricted to proposed Reach 3 work. A Habitat Mitigation and Monitoring Program is included in the Individual Permit Application being submitted to the Regulatory Branch of the San Francisco Corps of Engineers (Appendix C).

1.0 Description of Project

The Water District proposes to construct overflow channels and make other improvements within the Coyote Creek Reach 3 area. The proposed activities would affect jurisdictional waters and wetlands near the bridge crossings at either end of the project area, and at the area to be realigned south of SR 237.

Reach 3 is divided into two portions: (1) Reach 3A improvements, which include construction within about 5,700 linear feet of the channel near the northern portion of the Reach and construction of outer levees in this portion; and (2) Reach 3B, which includes activities in the remainder of the project area, about 7,300 linear feet including the two ends of Reach 3, defined as the Montague and SR 237 bridge crossings. Figure B-1 shows the limits of Reaches 3A and 3B within the project area.

Three types of construction will affect jurisdictional areas. In Reach 3A, the existing creek channel south of SR 237 will be realigned. This 630-foot realigned section will route water currently flowing around a fairly large meander into a more direct, straight channel. Earthen levees will be placed through the existing excavated depressions on the west side of the Creek in Reach 3A. In Reach 3B, rock and concrete slope and channel protection near the two bridge crossings will affect wetlands along the creek channel.

2.0 Purpose of the Wetland Delineation

The objective of this wetland delineation is to provide information to the Corps for use in processing the application from the Water District for a permit to construct the flood control improvements within Reach 3. This wetland delineation includes all areas within Reach 3, and wherever possible, impacts are evaluated separately for Reach 3A and Reach 3B. The Corps is ultimately responsible for making a determination of the limit of their jurisdiction for the purposes of assessing impacts to wetlands and waters before issuing permits for construction in these areas; this report is submitted to assist the Corps with this determination.

3.0 Environmental Setting

The project area includes all land within the proposed right-of-way from just downstream of the SR 237 bridge south and including the Montague Expressway bridge over Coyote Creek, in Santa Clara County, California. This corresponds to about 2.5 linear miles of creek, or 220 acres within the proposed right-of-way boundaries. In general, the project area is characterized by the meandering Coyote Creek corridor, which has steep banks formed by existing levee walls, and has a channel bed that ranges from 10 to 25 feet wide. Outside the existing levees, farming is the dominant existing land use within the proposed right-of-way. A more detailed description of the vegetation, soils, and hydrology of the site is found in Section 5, Results.

4.0 Methods

Three activities were undertaken to determine the limit of the Corps' jurisdiction in the project area:

1. A hydrologic model to determine the Ordinary High Water Line was run for the project area (Reaches 3A and 3B);
2. A field investigation of the creek channel and surrounding areas outside the levees on July 14 and 15, 1993 (Reach 3B and portions of 3A); and
3. A field investigation of the 2 man-made excavated depressions west of the levee and south of SR 237, in April 1993 and July 23, 1993 by the Corps of Engineers (Remainder of Reach 3A).

Sections 4.1 to 4.3, below, describe methods used for each of these investigations.

4.1 Hydrological Modeling of the Ordinary High Water Line

The limit of Waters of the United States extends to the Ordinary High Water (OHW) Line. This OHW line is generally understood to correspond to the elevation of the 2.3-year probability flood line (Lawrence, 1993). A HEC2 hydrologic model of Coyote Creek developed by the Water District during design of the flood control improvements was adjusted for calculations of the 2.3-year probability flood within the project area. The model used a starting point of SR 237, assuming no tidal backwater effects occur in this upstream portion of the creek. The model was run for both existing conditions and post-project conditions (assuming construction of the by-pass channel in Reach 3A).

The 2.3-year probability discharge was determined by plotting the 10- and 100-year probability discharge rates and interpolating the 2.3-year discharge using semi-log and probability graph paper. With these discharge scenarios, multiple profiles of water surface elevation across the creek were drawn, and the corresponding OHW elevations plotted on a topographic base map.

4.2 Field Investigation of the Main Creek Channel

A field investigation was undertaken on July 14 and 15, 1993 by two biologists, Beth Chambers of CH2M HILL, Oakland, California and Mara Noelle of The Habitat Restoration Group, Scotts Valley, California. All areas within the proposed right-of-way from just north of the SR 237 bridge to the south side of the Montague Expressway were delineated during these field visits, except for the excavated depressions located outside the west levee, south of SR 237.

Wetlands and jurisdictional waters were delineated in the field using methods outlined in the Corps' Wetland Delineation Manual (Waterways Experiment Station, 1987). This method is called a three-parameter method because it uses three indicators (hydrophytic plant community, hydric soils, and wetland hydrology) to determine whether an area is a jurisdictional wetland. For most circumstances, all three indicators must be present for the area to be a wetland.

During the survey, most dominant plant species were flowering or other species identification features were present, and evidence of the past winters' high water flows was observed. However, water levels had receded for several months, and little surface or subsurface saturation was observed outside of the immediate creek bed area. This timing allowed for most of the indicators of wetland conditions to be observed in the field, except that indirect evidence of hydrological indicators was used in lieu of direct observations of flooding or ponding outside of the active water channel.

Within the project area, 20 sampling points were established within or near areas that exhibited the potential for supporting hydrophytic plant communities. The project area was observed by walking and/or driving along the levee roads that offer access to nearly all of the project area. Sampling points were usually paired so that a wetland and upland sampling point were established perpendicular to the creek and on either side of the delineated wetland boundary.

At each sampling point, information on vegetation, soils, and hydrology was recorded on data forms. Dominant plant species in each strata which occurred within approximately 20 feet of the sampling point were recorded, and subdominant plant species were also recorded for some areas to give a more complete description of vegetation present. Plant taxonomy and wetland indicator status are consistent with Hickman (1993) and Reed (1988), respectively. Soils were sampled to a depth of approximately 12 inches, unless noted otherwise in the data forms. Evidence of wetland hydrology (e.g., presence of wrack lines) was recorded when observed at each sampling point.

The mapped limit of OHW (see Section 4.1) was compared to field evidence of the approximate limit of past floods; where field evidence clearly indicated that the modeled OHW level was incorrect, notations were made to adjust the limit of OHW. The wetland boundary was mapped based on results of the wetland sampling points, and where changes in the vegetation community were consistent with the findings of the vegetation and soil samples. These changes were observed along each bank, and in some areas, wetlands were mapped from viewing the bank opposite the observer.

The limit of wetlands mapped in the field was transferred to topographic maps after the field work was complete. Copies of the 20 field data forms completed for this project are included in Attachment A. Figures B-2, B-3, and B-4 show the approximate limits of jurisdictional areas identified within the areas of impact. Plates 1 through 6 included in Attachment B show these limits on large 1 inch = 100 feet topographic base maps, and show sampling point locations. As required for permit applications submitted to the San Francisco District of the Corps, a copy of the USGS quadrangle map showing the project site is included as Attachment C.

4.3 Field Investigation of the Excavated Depressions

Two excavated depressions, which are remnants of a former borrow operation, were delineated in separate field efforts conducted in late April of 1993[1] and on July 23, 1993[2]. Field methods were in compliance with the 1987 Corps' Delineation Manual (Waterways Experiment Station, 1987). Plates 5 and 6 show a preliminary map of the potential limit of jurisdictional area within the excavated depressions. This map was prepared by Rob Lawrence of the Corps of Engineers, and may be changed by the Corps as part of its ongoing investigation of the jurisdictional status of the excavated depressions.

---

[1] Conducted by Lynne Hosley of CH2M HILL, Oakland, California and Rob Lawrence, U.S. Army Corps of Engineers, San Francisco, California

[2] Conducted by Rob Lawrence and Dan Martel of the U.S. Army Corps of Engineers, San Francisco, California

5.0 Results

5.1 Waters and Wetland Determination and Delineation

5.1.1 Overview

Three areas were identified that are within the Corps' jurisdiction:

1. Areas inside the banks of Coyote Creek that are within the limit of the OHW (Reaches 3A and 3B),
2. One small seasonal wetland outside of the east creek levee, outside the project area, and
3. Portions of two excavated depressions outside the existing west levee near SR 237 in Reach 3A.

Wetlands within the project area occur primarily within the banks of the existing levees, between the open flowing water of the creek and the upper portions of the levees. Gravel and sand bars within the creek provide substrate for emergent marsh vegetation and other wetland plants that grow above the low flow channel. The limit of jurisdictional waters was determined to be the elevation of the OHW line, calculated as the 2.3-year probability discharge. No adjacent wetlands were identified within the levees that extended beyond the limit of OHW.

Outside of the channel near creek Station 596+00 and Bellew Drive, a seasonal wetland has formed in a disturbed area associated with historical farming structures. This seasonal wetland covers an area of approximately 0.07 acres (3,000 square feet). The dominant plant species in this seasonal wetland was Bermuda grass (*Cynodon dactylon*), a non-native species characteristic of disturbed areas. This wetland was determined to be outside of the project area and will not be discussed in further detail in this report.

The two excavated depressions were also determined to contain wetland areas, although at the time of the survey, the coverage of hydrophytic vegetation within the northernmost excavated depression was sparse. Vegetation in the northernmost excavated depression was all herbaceous, including the marsh timothy (*Phalaris* sp.) and russian thistle (*Salsola kali*). In the southern excavated depression, herbaceous species included seaside heliotrope (*Heliotropium curassavicum*) and rabbitsfoot grass (*Polypogon monspeliensis)*, with a few willows (*Salix* sp.) growing to form patches of a shrub vegetation layer.

5.1.2 Wetland Vegetation

Table B-4 lists those species (scientific name, common name, and wetland indicator status) included on the data forms found in Attachment A. This list is derived from the field investigation of the main creek. A few species observed in the excavated depressions are also listed in Table B-4, but a complete list of those species can be obtained by reference to field notes taken by Corps personnel during their field visits.

5.1.2.1 Coyote Creek Vegetation. The vegetation community within the Coyote Creek corridor has been characterized in detail in past environmental analyses; the creek supports one of the most extensive mature riparian forest in the San Jose area. For most of the creek, mature cottonwood (*Populas fremontii*) and sycamore (*Platanus racemosa*) form a canopy over shrub and herbaceous strata. Shrubs, such as blackberry (*Rubus ursinus*), and smaller trees (e.g., willows, box elder) grow from near the base of the levee slopes to the top of the levees.

Herbaceous species growing close to the active water channel include spreading bentgrass (*Agrostis stolonifera*), dotted smartweed (*Polygonum punctatum*), fragrant goldenrod (*Euthamia occidentalis*) and a few cattails (*Typha* spp.). In intermediate elevations (mid-way up the existing levee from the creek), mugwort (*Artemisia douglasiana*) and rough cockleburr (*Xanthium strumarium*) were prevalent. Rice grass (*Oryzopsis miliaceae*) usually dominated the drier, more upland areas of the levee, at elevations at or above the OHW line. Wetland vegetation grew as a band between the active flowing water and the upland vegetated areas of the upper levees. In some areas, wetland vegetation is growing within the active water channel, on gravel and sand bars formed by deposition or erosive scouring of the banks during storms. In some portions these areas were mapped in the field; however, in areas where no activities are proposed, these areas were not mapped in detail. It is assumed that these areas are likely to be created and destroyed in successive years, in response to the creek's dynamic hydrological regime.

The portions of the creek near the two existing bridges (Montague and SR 237) have experienced more disturbance to the vegetation, as indicated by a less dense canopy, and more invasive species growing on the levee. Especially near SR 237, the levee slopes are very steep, and invasive non-native species such as poison hemlock (*Conium maculatum*) are more prevalent than in other areas farther away from the bridges.

5.1.2.2 Vegetation in the Excavated Depressions. Vegetation in the northernmost excavated depression was all herbaceous, including the marsh timothy and russian thistle. The presence of halophytes, such as marsh heather (*Frankenia grandifolia*) indicates that the soil has elevated salinity or alkalinity. In the southern excavated depression, herbaceous species included seaside heliotrope and rabbitsfoot grass with a few willows (*Salix* sp.) growing to form patches of a shrub vegetation layer. Other herbaceous plant species observed in this depression include salt grass (*Distichlis spicata*), milk thistle (*Silybum marianum*), and toad rush (*Juncus bufonius*).

5.1.3 Soils

5.1.3.1 Coyote Creek Soils. Three soil series are mapped within the Coyote Creek Reach 3 study area: (1) Mocho loam, (2) Mocho clay loam, and (3) Cropley clay loam (U.S. Department of Agriculture, 1958). Neither the Mocho loam or Mocho clay loam soils are included on the county or national lists of hydric soils; Cropley clay loam is not included in the national list of hydric soils, but is considered hydric in the Santa Clara area, where it has Campbell soil components (U.S. Department of Agriculture, date unknown; U.S. Department of Agriculture, 1991).

Most of the creek is within the Mocho loam mapping unit. These soils are described as brown to pale-brown (Munsell soil color = 10YR3/3), friable, and slightly calcareous loam soils that occur primarily in the upper reaches of Coyote Creek north of San Jose (U.S. Department of Agriculture, 1958).

Soil pits dug within the creek banks revealed that much of the soils near the lower levees and near the creek bed were sandy loams, or fairly unconsolidated sand deposits indicative of alluvial conditions. Within the creek bed, gravels and large rocks were observed. Soils were generally not saturated above the level of the open water in the creek bed. Evidence of past saturation was evident in some pits dug in the inside levee wall, as orange (10YR4/6 and 5YR5/8) and green/gray (5Y4/1) mottles were visible within a dark brown (10YR3/2) matrix. In many places within the creek banks, soils were not mottled, but were determined to be hydric based on evidence that the soils are frequently flooded, using the National Technical Committee for Hydric Soils' hydric soils criteria number 4 (U.S. Department of Agriculture, 1991). Evidence for frequency of flooding included observations of a dominant hydrophytic vegetation community, and indirect hydrologic indicators of the limit of OHW.

Some disturbances to soils were observed, especially outside and adjacent to the levees. Soils had been disturbed by fill, excavation, construction, and other activities involving movement of earth for creation of the levees and for farming activities. In several areas, pieces of former concrete bridge abutments (e.g., Station 643) or evidence of past water pump structures were observed at the creek bank.

5.1.3.2 Soils within the Excavated Depressions. The excavated depressions near SR 237 were created by the removal of topsoil and mineral soil for borrow material. These areas were mapped as Mocho loam, but the soils do not always resemble the Mocho loam soil type, since the A horizon was removed when the depressions were created. Within the southern excavated depression, soils were light brown (10YR3/3) and a silty loam at the surface, and a lighter brown clay loam with orange and dark brown mottling at depth (about 10 to 12 inches below the surface). Soil colors within the northern excavated depression are noted on the data forms completed by the Corps' staff.

5.1.4 Wetland Hydrology

5.1.4.1 Coyote Creek Hydrology. Hydrological modeling of Reach 3 of Coyote Creek found that the OHW discharge is equal to approximately 1,500 cubic feet per second (cfs), using probability paper to interpolate the 2.3 year flood. If semi-log paper was used to interpolate the 2.3-year flood, a value of 4,200 cfs was derived; a comparison of the resultant flood levels indicated that the 1,500 cfs discharge calculation more accurately reflected the ordinary flooding level. In profile, this discharge corresponds to an elevation about one-half to three-quarters up the inside slope of the existing levees.

Evidence of high water flows were observed in the field; however, during the past year, greater than normal rainfall occurred, and storms much larger than the 2.3-year probability storm occurred. Wrack lines were visible nearly up to the top of the existing levees in much of the creek. Other field observations can be used to indicate the elevation at which the OHW flows appear to influence the creek channel, such as the point at which perennial vegetation predominates over forbs and grasses indicative of a more frequently flooded hydrological regime (Martel, 1993). The limit of wetlands was mapped as the limit of where hydrophytic plant species grew within the apparent OHW line.

Surface saturation was limited to the creek bed, or those areas immediately adjacent to the open flowing creek waters. No saturated soils were observed at depth in pits dug on the levee.

5.1.4.2 Hydrology of the Excavated Depressions. Excavation of the borrow pits created depressions that seasonally become ponded. These excavated depressions pond with water during the winter rainy period, and provide habitat for waterfowl and shorebirds during that time. The presence of a loamy clay layer at depth in these excavated depressions (see Section 5.1.3.2, Soils of the Excavated Depressions) probably prevent rapid seepage from the ponds, so that they can hold water for a significant period of time, and do support hydrophytic vegetation in areas of lower elevation. These excavated depressions do not appear to be hydrologically connected with Coyote Creek.

5.1.5 Upland Conditions

Uplands (non-jurisdictional areas) within the project site include portions of the existing levee above the OHW line, the top and outside slopes of the levees, and adjacent lands outside of the creek corridor. Within the levees, vegetation in the upland areas includes much of the riparian corridor; most of the large cottonwood and sycamore trees appear to be rooted above the OHW line. The limit of wetland vegetation within the creek banks usually occurs where rice grass becomes the dominant understory grass. Other upland herbaceous species on the levee banks included wild radish (*Raphanus sativus*) and various species of thistles. Blackberries generally grew up the levee banks, from near the OHW line, up to the levee top roads. Outside the levees, vegetation consisted largely of farmed crops or ruderal vegetation characteristic of disturbed areas. Thistles (e.g., *Silybum marianum*), sweet fennel (*Foeniculum vulgare*), and wild oats (*Avena barbata*) were common herbaceous species. Trees and shrubs were not commonly observed outside the levees, except where planted for ornamental reasons.

Soils outside the levees were generally brown (10YR3/3) loamy soils, which are well suited to the prevalent agricultural land use (U.S. Department of Agriculture, 1958). Areas not delineated as wetlands or jurisdictional waters were fairly well-drained, and were not saturated at the surface during the field investigation.

5.2 Wetland Functions and Values

5.2.1 Coyote Creek Wetlands—Functions and Values

Coyote Creek wetlands provide high quality habitat value for riparian species and other wildlife species that use the riparian corridor as foraging, hunting, nesting and breeding habitat. The open flowing waters of the creek provide aquatic habitat for fish species, and provide spawning and rearing habitat for steelhead and chinook salmon. An in-depth analysis of the area's value as a riparian and fisheries habitat is included in the FR/EIS and the FEA. Coyote Creek wetlands also provide some flood control and stormwater conveyance functional values, and the surface waters of Coyote Creek are expected to recharge groundwater in the vicinity.

Further discussion of the environmental resources and impacts associated with this project is included in Section 4 of the Individual Permit Application.

5.2.2 Excavated Depressions—Wetland Functions and Values

The two excavated depressions pond with local runoff in the spring, forming seasonal ponds that support some wetland vegetation and provide nesting and feeding habitat for waterfowl and shoreline birds in the spring. These depressions are not expected to perform groundwater recharge or water quality improvement functions. However, since they do retain water in the winter, they may assist with flood control in the vicinity.

6.0 Discussion

6.1 Project Impacts

The environmental impacts of the Coyote Creek Reach 3 project have been assessed in the FR/EIS, FEIS, and FEA and summarized in the Individual Permit application. During preparation of the earlier environmental documents, no direct assessment of impacts to jurisdictional areas (waters of the U.S.) was undertaken.

Table B-2 summarizes the loss of wetlands and jurisdictional areas for Reaches 3A and 3B. A total of 4 acres of jurisdictional area could be directly affected by these activities; of this total, 1.6 acres are considered to be wetlands in this assessment.

In addition to the direct loss of wetlands through proposed filling activities, the southern excavated depression would have approximately 0.2 acre affected by excavation for removal of the existing eastern levee adjacent to the pond. The remaining 1.2 acres of seasonal wetlands within the southern excavated depression may be indirectly affected by the project. Excavation of the adjacent overflow channel east of the depressions could act to alter the local hydrology that supports wetland conditions in this area.

Wetlands are considered to be "Special Aquatic Sites" within the Clean Water Act regulations, and are afforded special consideration in the permitting process. Approximately 0.8 acres (33,000 square feet) of new jurisdictional waters would be created within the by-pass channel. Portions of this 0.8 acres may form wetland communities; however, the area would not form a woody riparian vegetation community, because it would be maintained to prevent growth of dense vegetation that could impede flood waters.

The potential direct loss of wetlands and jurisdictional areas can be organized into the following 6 proposed construction activities:

1. Channel Realignment Construction–(Reach 3A)
2. SR 237 Transition Structure (Reach 3A)
3. Outer Levee Construction, North Excavated Depression–(Reach 3A)
4. Outer Levee Construction, South Excavated Depression–(Reach 3A)
5. SR 237 Transition Structure–(Reach 3B)
6. Montague Expressway Transition Structure–(Reach 3B)

Table B-3 summarizes the loss of jurisdictional wetlands and waters for each of these proposed activities. Figures B-5, B-6, and B-7 show areas of wetlands impact within Reach 3.

Measures to mitigate for loss of riparian habitat and wetlands areas are described in the FEIS, FR/EIS, and FEA and are included as part of the Coyote Creek Reach 3 project. A total of 32.5 acres of riparian habitat will be created in Reaches 2 and 3 to mitigate for the estimated loss of 13.6 acres of riparian habitat within Reaches 1-3 of the entire lower Coyote Creek. In addition, creation of seasonal wetlands is proposed at a ratio of 1:1 (acres created:acres lost) to mitigate for loss of portions of the seasonal wetlands within the two excavated depressions in Reach 3A. A Habitat Mitigation and Monitoring Program is included in Appendix C of the Individual Permit Application.

6.2 Regulatory Requirements

Construction of the realigned channel and new levee by the Water District will require a permit in compliance with regulations promulgated under Section 404 of the Clean Water Act. Coyote Creek waters in Reach 3 may also be considered navigable waters, and would then require a permit in compliance with Section 10 of the Rivers and Harbors Act. The Corps is responsible for making a determination of the limit of Section 10 jurisdiction.

The project would require an Individual Permit, because the project does not appear to comply with existing Nationwide Permits. For instance, Nationwide Permit 26 allows for up to 10 acres of wetland fill, but not for areas that are below headwaters (defined by waters with a mean annual flow of less than 5 cubic feet per second). Figure B-8 shows the drainage area for Reach 3 of Coyote Creek, illustrating its downstream position in the watershed.

In addition to the Section 404 and potential Section 10 Army Corps Permit, the project will also require the following permits:

- A California Department of Fish and Game Section 1601 Streambed Alteration Agreement;
- A Regional Water Quality Control Board Stormwater National Pollutant Discharge Elimination System Permit; and
- A RWQCB Section 401 Water Quality Certification.

7.0 Conclusions

Within the 2.5-mile long project area, 21.3 acres of jurisdictional wetlands and waters have been identified. About 4 acres of jurisdictional areas would be directly affected by the project; 1.6 acres of which are likely to be considered wetlands. Within Reach 3A, the jurisdictional area affected is about 1.9 acres, with about 0.9 acres of this total being wetland. In Reach 3A, an additional 1.2 acres of wetland could be indirectly affected by the project due to changes in the hydrology of the excavated depressions and 0.2 acres would be excavated to a greater depth. Within Reach 3B, the jurisdictional area affected is about 2.1 acres, with about 0.7 acres of this total fulfilling the wetlands criteria.

The key functional values that would be affected by the proposed activities would be the significant habitat values provided by the riparian vegetation that grows within the Coyote Creek corridor. The proposed mitigation measures include revegetation of riparian habitat adjacent to the overflow channel. This mitigation was developed as part of the National Environmental Protection Act's environmental assessment process, and was developed to restore and enhance wildlife habitat values inherent in the Coyote Creek riparian corridor.

8.0 Citations

Hickman, J.C., Ed., 1993. *The Jepson Manual.* University of California Press, Berkeley, CA.

Lawrence, Robert J., 1993. Biologist, Regulatory Branch, U.S. Army Corps of Engineers, San Francisco, California. Telephone conversation and personal communication with Beth Chambers, CH2M HILL, Oakland California. July 21 and 23, 1993.

Martel, Dan, 1993. Wetland Specialist, Regulatory Branch, U.S. Army Corps of Engineers, San Francisco, California. Personal communication with Beth Chambers, CH2M HILL, Oakland California. July 23, 1993.

Reed, P.B. 1988. *National List of Plant Species that Occur in Wetlands: California (Region 0).* U.S. Fish and Wildlife Service, Washington, D.C. Biol. Rpt. 88(24).

Waterways Experiment Station, 1987. *Corps of Engineers Wetlands Delineation Manual.* U.S. Army Corps of Engineers, Wetlands Research Program Technical Report Y-87-1. Environmental Laboratory, Waterways Experiment Station, Vicksburg MS.

U.S. Army Corps of Engineers, 1987. Final Environmental Impact Statement (FEIS) for the Coyote and Berryessa Creeks, California Project. U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers, 1988. Feasibility Study/Environmental Impact Statement for the Coyote and Berryessa Creeks, California Project. U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers, 1992. Public Notice 92-2. San Francisco District, California.

U.S. Army Corps of Engineers, 1993. Final Environmental Assessment for the Coyote Creek Project Element of the Coyote and Berryessa Creeks, California Project. U.S. Army Corps of Engineers.

U.S. Department of Agriculture, date unknown. Field office official list of hydric soils for soils in the Santa Clara Area, California. Soil Conservation Service, U.S. Department of Agriculture, Gilroy, CA.

U.S. Department of Agriculture, 1958. *Soil Survey of Santa Clara County, California.* Soil Conservation Service in cooperation with University of California Agricultural Experiment Station.

U.S. Department of Agriculture, 1991. *Hydric Soils of the United States.* Soil Conservation Service, U.S. Department of Agriculture Miscellaneous Publication Number 1491.

Table B-1
Summary of Wetlands and Water Types Within Reach 3A and Reach 3B of the Coyote Creek Flood Control Project Area

Reach: Area of Concern	Wetlands or Waters Type	Total Area (acres)
Reach 3A: Coyote Creek	Wetlands and Waters	7.4
Reach 3A: Excavated Depressions	Wetlands	4.0
Reach 3B: Coyote Creek	Wetlands	9.9
TOTAL		**21.3**

Table B-2
Summary of Impacts to Jurisdictional Areas and Wetlands within each Reach

	Wetland Area Impacted		**Jurisdictional Area Impacted**	
	Square feet	**Acres**	**Square feet**	**Acres**
Reach 3A	38,910	0.89	82,910	1.90
Reach 3B	32,000	0.73	91,800	2.11
Total Reach 3	**70,910**	**1.6**	**174,710**	**4.0**

Table B-3
Summary of Impacts to Wetlands and Waters by Proposed Activity

Activity	Dimensions/Notes	Wetlands Area Affected (Square feet)/ (Acres)	Total Jurisdictional Area Affected	
			(Square feet)	(Acres)
Jurisdictional Area				
1. Construction of the Realigned Channel (Reach 3A)	Approximately 900 linear feet of channel replaced by 630 feet of channel (net loss of 270 linear feet of channel)	16,000 (0.37)	48,000	1.10
2. Rock lining near SR 237 Transition (Reach 3A)	About 300 linear feet of channel to be lined with rock	3,000 (0.07)	15,000	0.34
3. West Levee Construction, North Excavated Depression (Reach 3A)	Western edge of excavated depression could be graded to create outer levee wall	13,510 (0.31)	13,510	0.31
4. West Levee Construction, South Excavated Depression (Reach 3A)	Western edge of excavated depression could be graded to create outer levee wall	6,400 (0.15)	6,400	0.15
5. SR 237 Transition Structure (Reach 3B)	220 linear feet of rock lining, 690 linear feet of concrete lining	19,600 (0.45)	45,500	1.04
6. Montague Expressway Transition Structure (Reach 3B)	About 700 linear feet of rock lining within all or portions of the channel	12,400 (0.28)	46,300	1.06
TOTAL FILL		**70,910** **(1.6)**	**174,710**	**4.0**
Excavation and Hydrology Impacts				
7. Excavation of Adjacent Overflow Channel, South Excavated Depression	230 x 40 feet excavated	9,500 (0.2)	95,00	0.2
	Remainder of excavated depression potentially drained	53,168 (1.2)	53,168	1.2

Table B-4
Plant Species Observed During Wetland Field Surveys of Reach 3 of Coyote Creek

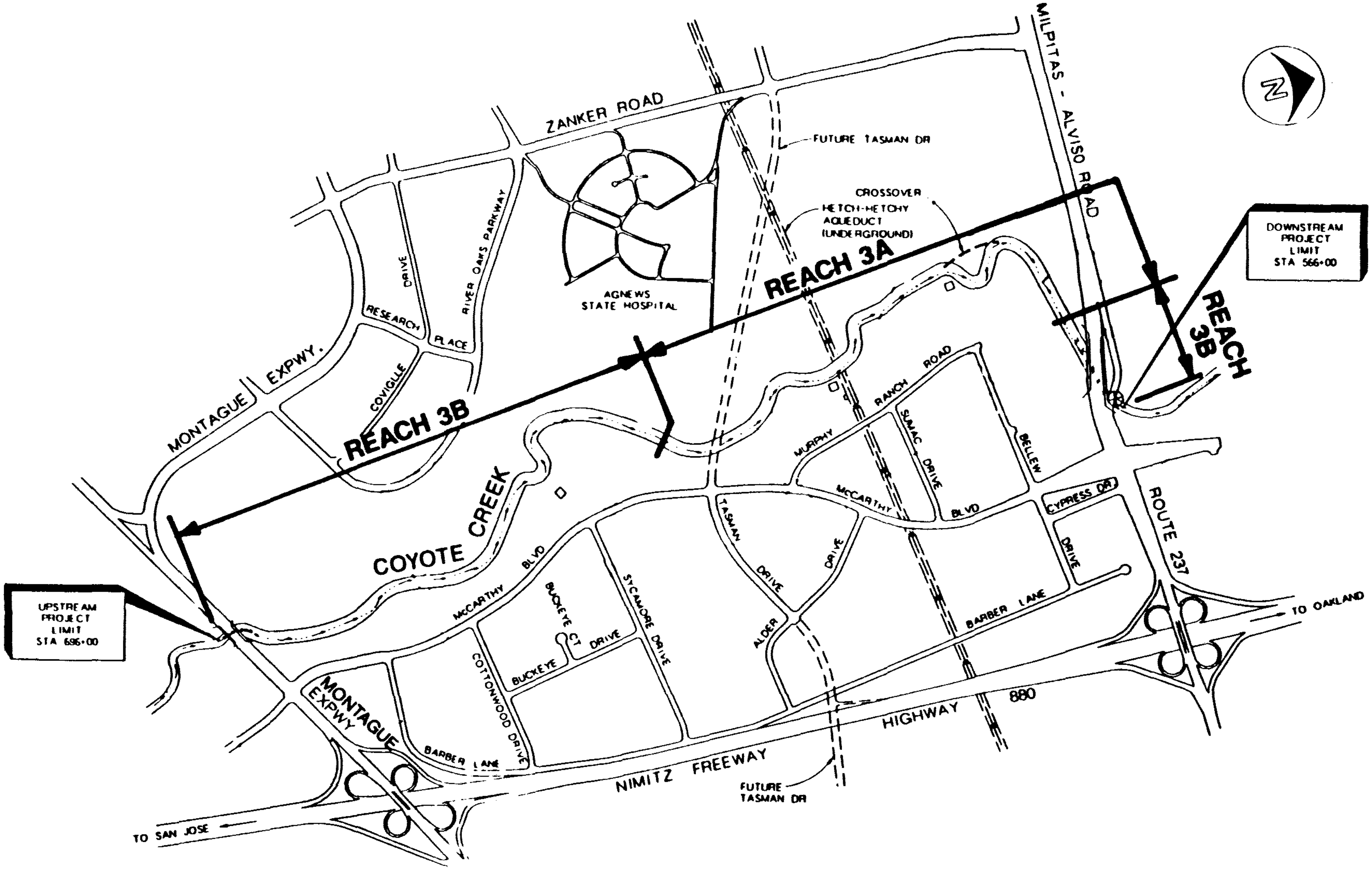
Scientific Name	Common Name	Wetland Indicator Status
Agrostis stolonifera	spreading bentgrass	FACW
Artemisia douglasiana	Douglas' mugwart	FACW
Avena barbata	wild oats	NL
Baccharis pilularis	coyote bush	NL
Brassica geniculata	mustard	NL
Cynodon dactylon	Bermuda grass	FAC
Distichlis spicata	saltgrass	FAC
Euthamia occidentalis	fragrant golden-rod	OBL
Foeniculum vulgare	sweet fennel	FACU
Helenium sp.	sneezeweed	OBL
Heliotropium curassavicum	seaside heliotrope	OBL
Juncus bufonius	toad rush	FACW+
Lolium perenne	perennial ryegrass	FAC
Melilotus alba	white sweetclover	FACU+
Oryzopsis miliaceae	rice grass	NL
Picris echioides	prickly ox-tongue	FAC
Plantago major	common plantain	FACW-
Polygonum punctatum	dotted smartweed	OBL
Polypogon monspeliensis	rabbitsfoot grass	FACW+
Populus fremontii	cottonwood	FACW
Raphanus sativus	wild radish	NL
Ricinus communis	castor bean	FACU
Rubus ursinus	blackberry	FACW
Rumex crispus	curly dock	FACW
Salix lasiolepis	arroyo willow	FACW
Salsola kali	Russian thistle	FACU-
Scirpus americanus	bulrush	OBL
Silybum marianum	thistle	NL
Typha latifolia	narrow-leaved cattail	OBL

Table B-4
Plant Species Observed During Wetland Field Surveys of Reach 3 of Coyote Creek

Scientific Name	Common Name	Wetland Indicator Status
Urtica dioica	stinging nettle	FACW
Xanthium strumarium	rough cockleburr	FAC+

Key:

OBL	OBLIGATE–Occur almost always under natural conditions in wetlands
FAC	FACULTATIVE–Equally likely to occur in wetlands or nonwetlands
FACU	FACULTATIVE UPLAND–Usually occur in nonwetlands, but occasionally found in wetlands
FACW	FACULTATIVE WETLAND–Usually occur in wetlands, but occasionally occur in nonwetlands
NL	NOT LISTED–Not listed in National List of Plant Species that Occur in Wetlands; presumed an upland plant
NI	NO INDICATOR–Insufficient information available to determine indicator status.
+/-	Indicates greater (+) or lesser (-) frequency in wetlands or uplands



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

DATUM: NGVD

FIGURE B-1

LIMIT OF REACHES 3A AND 3B OF COYOTE CREEK

0 1800

FEET

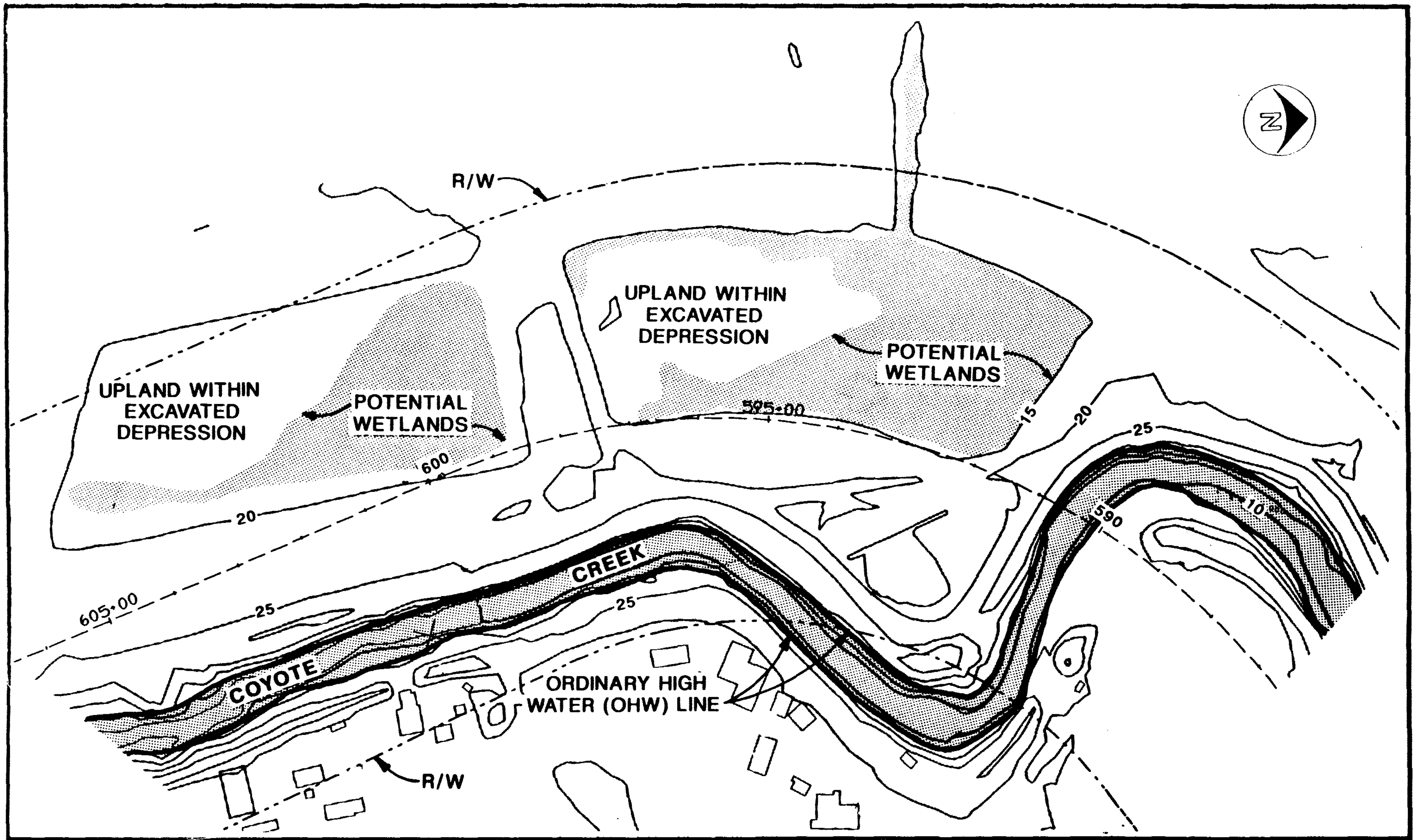
PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS, COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93


R/W
UPLAND WITHIN EXCAVATED DEPRESSION
POTENTIAL WETLANDS
UPLAND WITHIN EXCAVATED DEPRESSION
POTENTIAL WETLANDS
595+00
600
605+00
590
15
20
25
10
20
25
25
COYOTE
CREEK
ORDINARY HIGH WATER (OHW) LINE
R/W
N

PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W	RIGHT-OF-WAY
▨	JURISDICTIONAL WATERS

DATUM: NGVD

FIGURE B-2

LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT THE CROSSOVER AREA

0 200
FEET

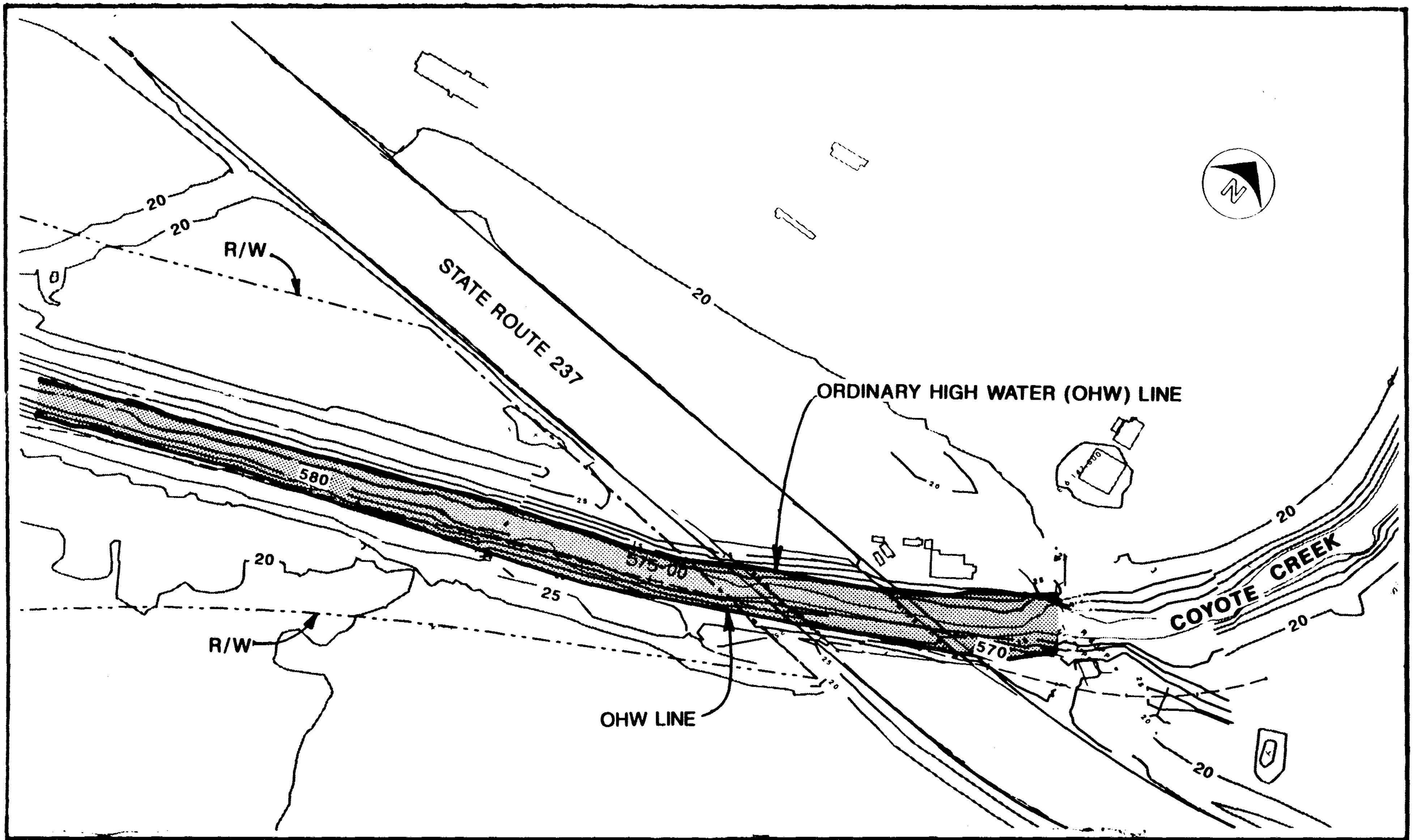
PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT-OF-WAY

▨ JURISDICTIONAL WATERS

DATUM: NGVD

FIGURE B-3

LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT SR 237

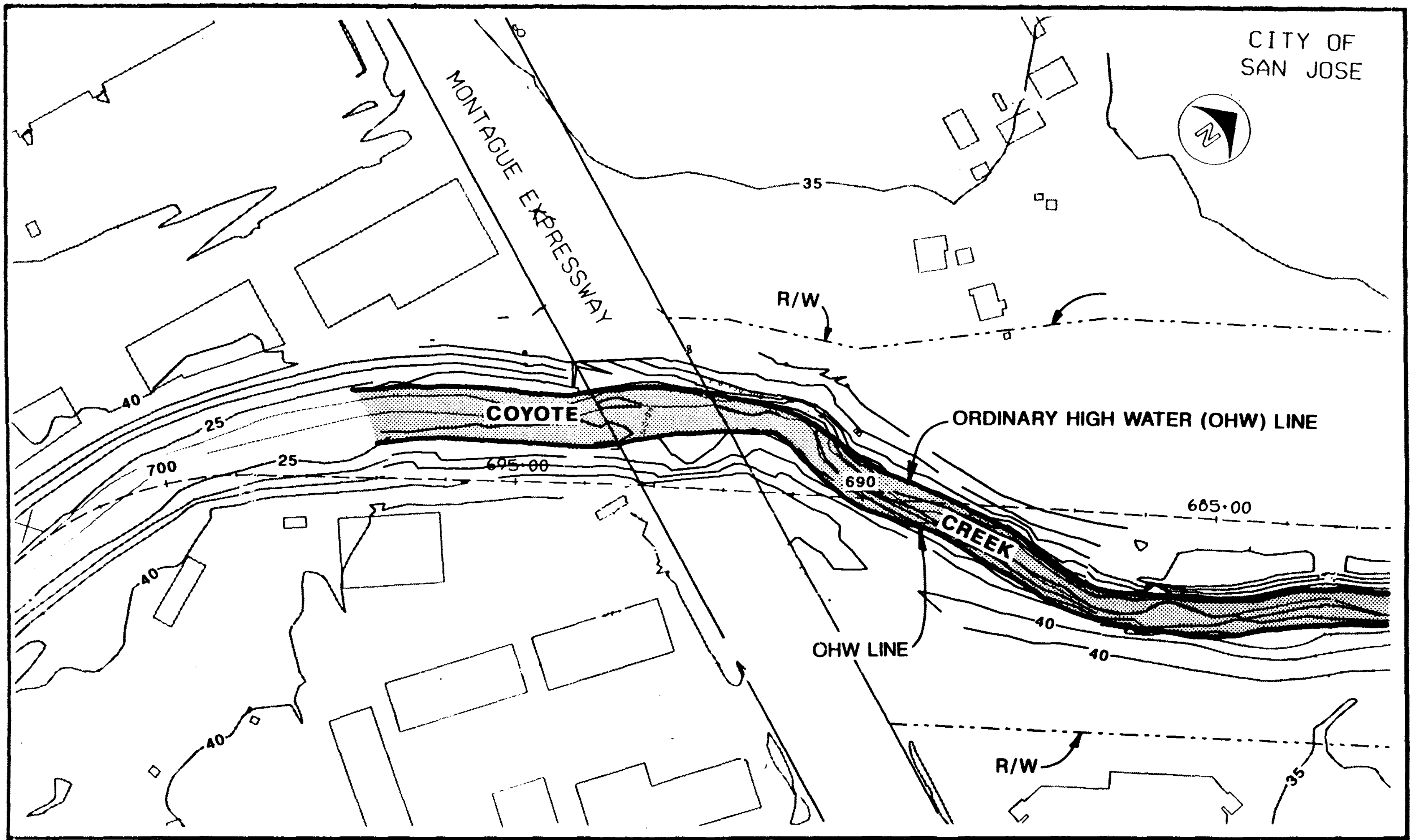
0 200
FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT-OF-WAY

▨ JURISDICTIONAL WATERS

DATUM: NGVD

FIGURE B-4

LIMIT OF JURISDICTIONAL WATERS AND WETLANDS AT MONTAGUE EXPRESSWAY

0 200
FEET

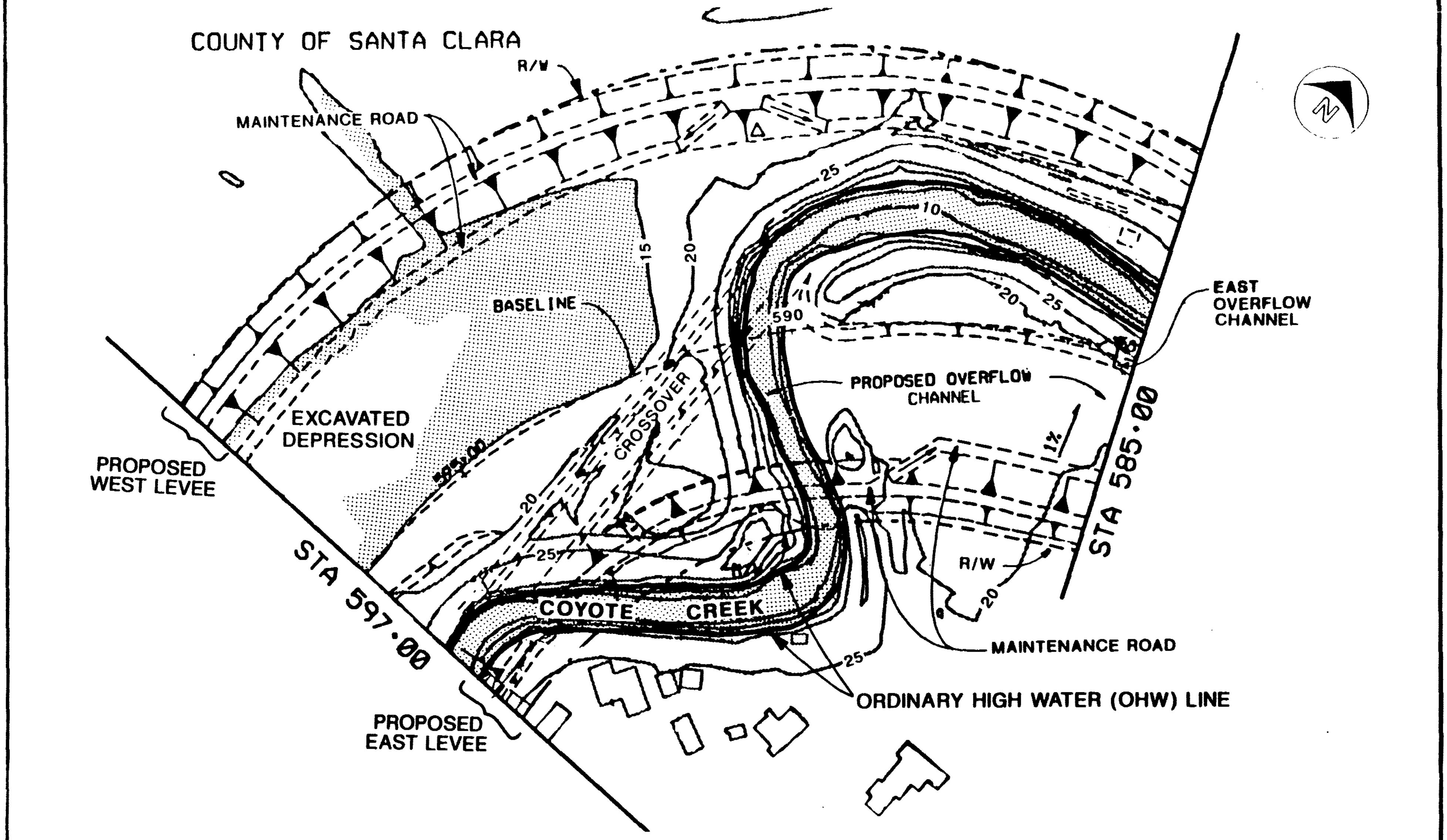
PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W RIGHT OF WAY

--- PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE B-5

WETLANDS IMPACTS IN REACH 3 AT THE CROSSOVER AREA

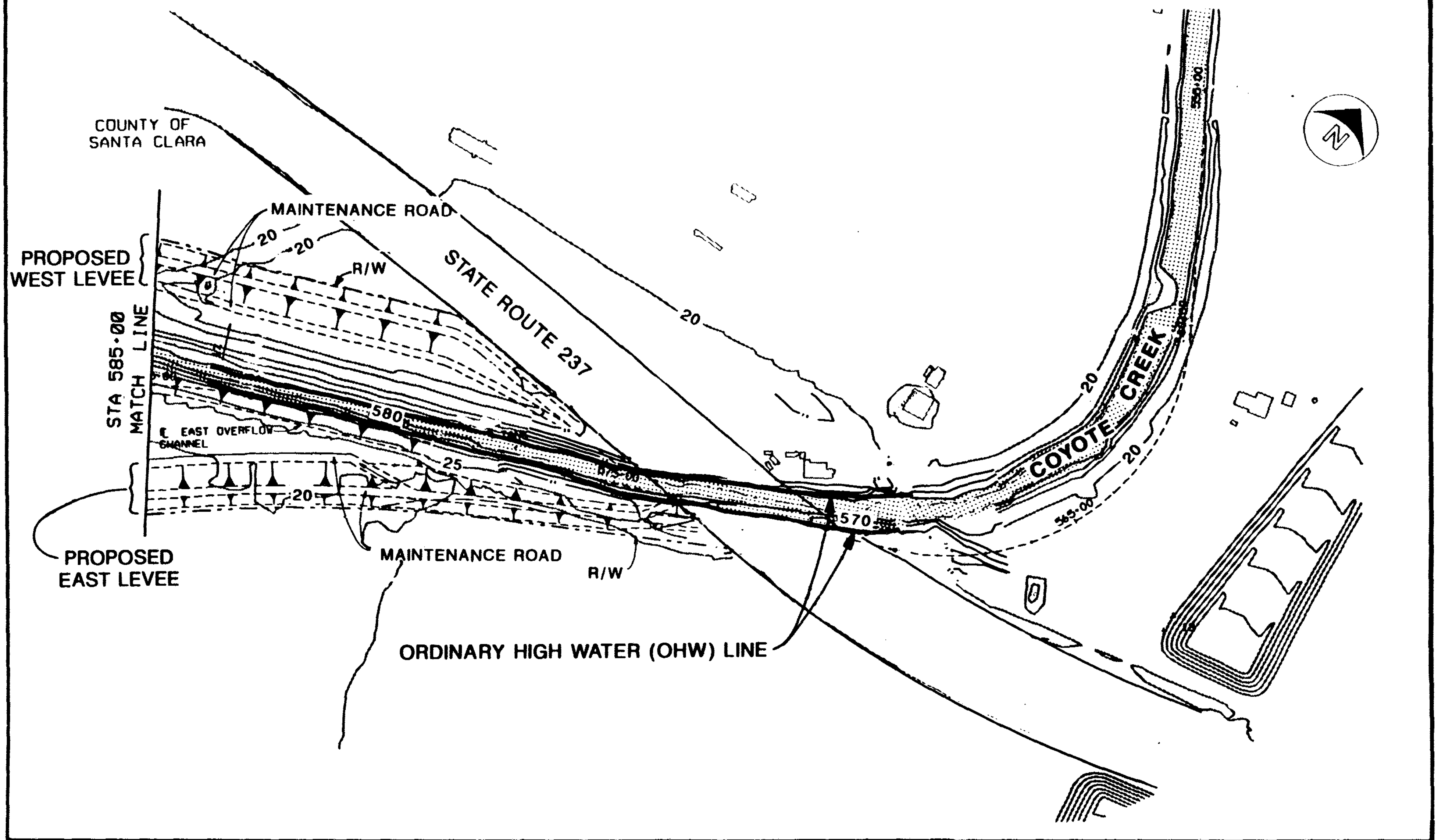
0 200
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W	RIGHT OF WAY
- - -	PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE B-6
WETLANDS IMPACTS
IN REACH 3 AT SR237

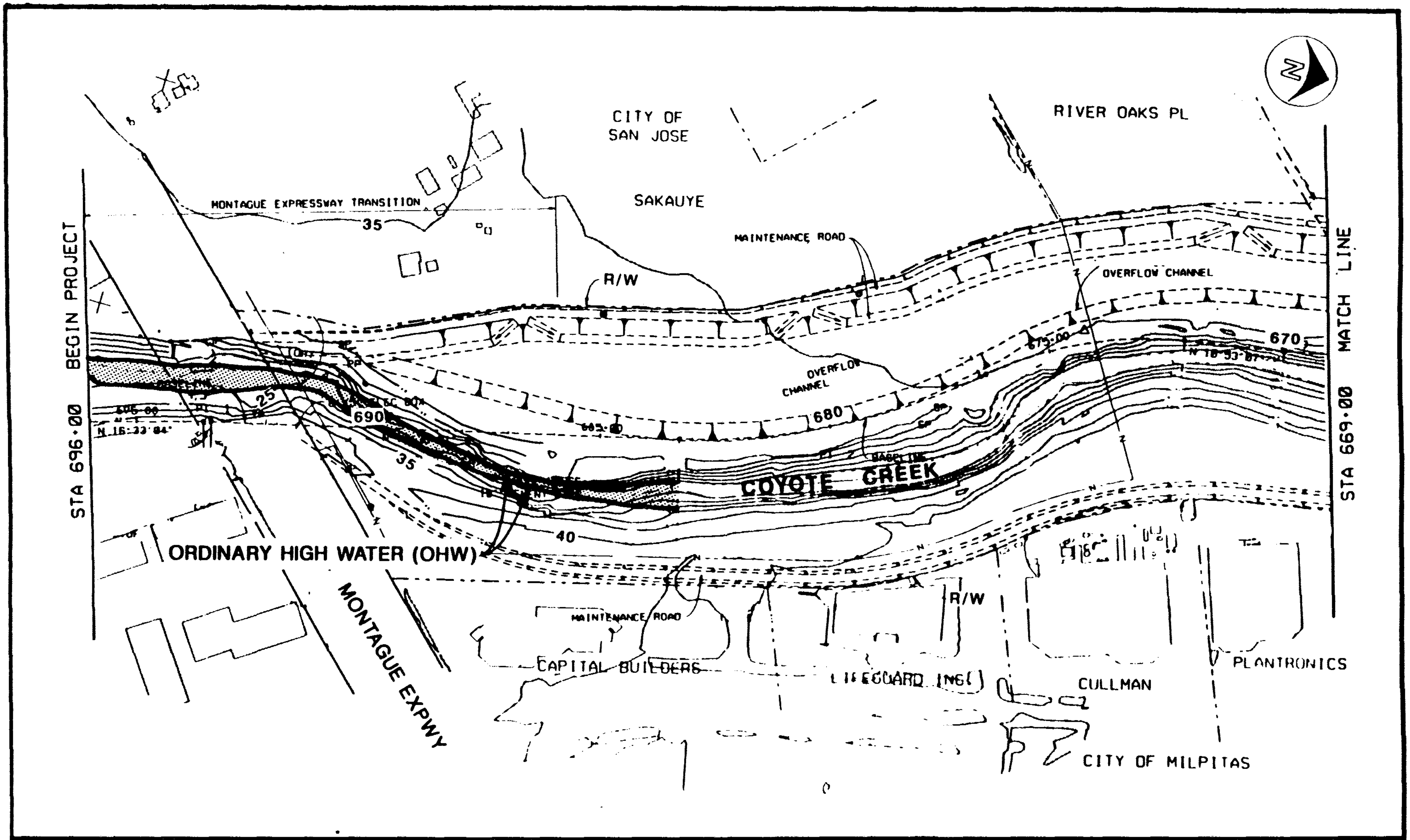
0 300
FEET

PROPOSED REACH 3 COYOTE CREEK
FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF DATE:8/93



PURPOSE: COYOTE CREEK FLOOD CONTROL IMPROVEMENT PROJECT

LEGEND:

R/W	RIGHT OF WAY
---	PROPOSED IMPROVEMENTS

DATUM: NGVD

FIGURE B-7

WETLANDS IMPACTS IN REACH 3 AT MONTAGUE EXPRESSWAY

0 300
FEET

PROPOSED REACH 3 COYOTE CREEK FLOOD CONTROL IMPROVEMENTS

IN: CITIES OF SAN JOSE & MILPITAS
COUNTY OF SANTA CLARA, CALIFORNIA

APPLICATION BY: SCVWD
5750 ALMADEN EXPWY
SAN JOSE, CA 95118

SHEET OF

DATE:8/93

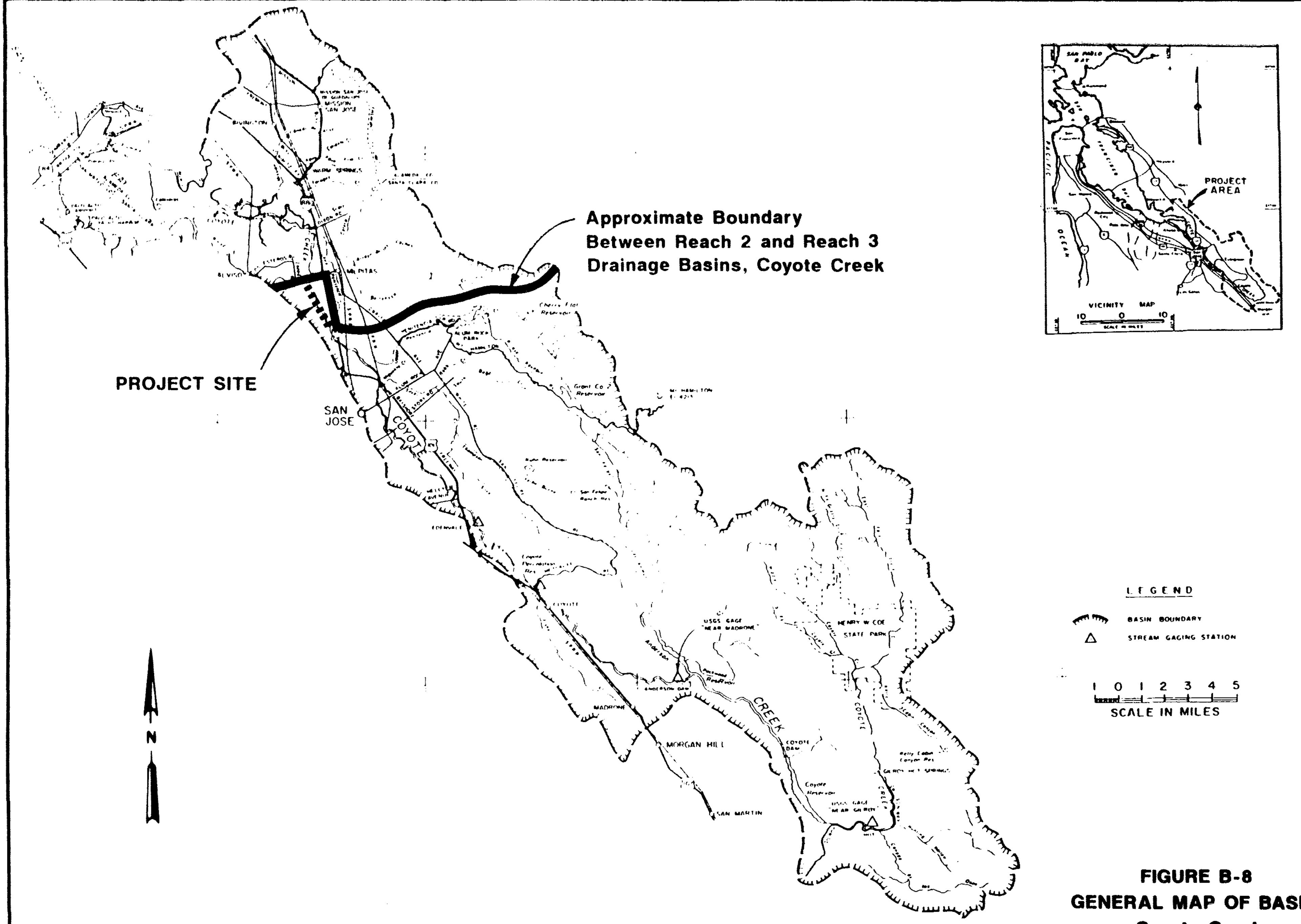


FIGURE B-8
GENERAL MAP OF BASIN
Coyote Creek

Attachment A
Data Forms for Jurisdictional Delineation of Wetlands and Waters

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **1**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Subdominant Plant Species	Indicator Status	Stratum
1. ***Typha latifolia***	**OBL**	**herb**	1. ***Picris echioides***	**FAC**	**herb**
2. ***Xanthium strumarium***	**FAC+**	**herb**	2. ***Rubus ursinus***	**FACW**	**herb**
3. ***Euthamia occidentalis***	**OBL**	**OBL**	3.		
4.			4.		
5.			5.		
6.			6.		
7.			7.		
8.			8.		
9.			9.		
10.			10.		

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes **X** No ___ Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: **5YR4/6; 5YR5/8**
Other hydric soil indicators: **Significant mottling of iron concretions in A horizon; matrix upper 4" 10YR4/2.**
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Mottling**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Water marks; sediment deposits; water mottled vegetation; within 10' of Creek.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: **Frequent flooding**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **2**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Oryzopsis miliaceae***	**NL**	**herb**	1.	***Brassica geniculata***	**NL**	**herb**
2.	***Avena barbata***	**NL**	**herb**	2.	***Ricinus communis***	**FACU**	**herb**
3.	***Artemisia douglasiana***	**FACW**	**herb**	3.	***Foeniculum vulgare***	**FACU**	**herb**
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **33**
Is the hydrophytic vegetation criterion met?
Yes ___ No **X**

Rationale: **Hydrophytic vegetation not dominant.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: ___
Other hydric soil indicators: ___
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: ___

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: ___

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **No wetland indicators present.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **3**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Agrostis stolonifera***	**FACW**	**herb**	1.	***Melilotus alba***	**FACU+**	**herb**
2.	***Xanthium strumarium***	**FAC+**	**herb**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: ___
Other hydric soil indicators: **Sandy soil; alluvial material.**
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Frequently flooded soil based on placement in creek.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Sediment deposits; bench adjacent to low flow channel.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: **Water marks; drift lines; sediment deposits.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **Based on vegetation and hydrology indicators.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **4**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Orysopsis miliaceae***	**NL**	**herb**	1.			
2.	***Rubus ursinus***	**FACW**	**shrub**	2.			
3.	***Populus fremontii***	**FACW**	**tree**	3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **67**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: ___
Other hydric soil indicators: **Loamy-sand**
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: **No indicators.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Upper terrace of creek.

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: **Above Ordinary High Water line.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **Although some hydrophytic plants present, wetland soil and hydrology indiators not present.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **5**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Oryzopsis miliaceae***	**NL**	**herb**	1.			
2.	***Populus fremontii***	**FACW**	**tree**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **50**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale:

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/3** Mottle Colors:
Other hydric soil indicators: **None; sandy loam**
Is the hydric soil criterion met? Yes ___ No **X**
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth:
Is the soil saturated? Yes **X** No ___ Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:
Soil saturated to below 12".

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: **Within high gently sloping terrace above creek (approximately 4-6' above water line in elevation.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No.**
Rationale for jurisdictional decision: **Soil criteria not met; few hydrophytic plants present. Within Ordinary High Water line, but not wetland.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **6**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Typha latifolia***	**OBL**	**herb**	1.	***Polygonum punctatum***	**OBL**	**herb**
2.	***Euthamia occidentalis***	**OBL**	**herb**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Obligate vegetation dominant.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes **X** No ___ Gleyed? Yes **X** No ___
Matrix Color: **5Y4/1** Mottle Colors: **7.5YR3/4; 10YR3/3**
Other hydric soil indicators: **Sandy soils; saturated.**
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Low matrix chroma with mottles; reducing conditions.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes **X** No ___ Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
depth to soil saturation 10"; drift lines, water-stained levees.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: **Creek channel.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **7**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Oryzopsis miliaceae***	**NL**	**herb**	1.	***Picris echioides***	**FAC**	**herb**
2.	***Populus fremontii***	**FACW**	**tree**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **50**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale:

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors:
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: **Does not appear to be frequently flooded.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth:
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: **Above Ordinary High Water line.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **No soil or hydrology wetland indicators; not many hydrophytic plants present.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **8**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes **X** No ___

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Xanthium strumarium***	**FAC+**	**herb**	1.	***Picris echioides***	**FAC**	**herb**
2.	***Rubus ursinus***	**FACW**	**shrub**	2.			
3.	***Artemisia douglasiana***	**FACW**	**herb**	3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **FAC and FACW plants dominant.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: ___
Other hydric soil indicators: **Alluvial sandy soils**
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Although color is not consistent with chroma and mottling criteria, frequently flooded alluvial soils.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Within Ordinary High Water line based on wrack lines, sediment deposits.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: **Within Ordinary High Water line.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **Primarily based on vegetation and hydrology; soils appear to experience frequent flooding to support hydrophytic vegetation.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **9**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Subdominant Plant Species	Indicator Status	Stratum
1. ***Orysopsis miliaceae***	**NL**	**herb**	1.		
2. ***Rubus ursinus***	**FACW**	**shrub**	2.		
3.			3.		
4.			4.		
5.			5.		
6.			6.		
7.			7.		
8.			8.		
9.			9.		
10.			10.		

Percent of dominant species that are OBL, FACW, and/or FAC: **50**
Is the hydrophytic vegetation criterion met?
Yes ___ No **X**

Rationale: **Rubys ursinus is FACW, but community also grows in upland areas of levee.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/3** Mottle Colors:
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: **Does not appear to be flooded frequently.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth:
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: **No wrack lines or water lines.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No.**
Rationale for jurisdictional decision: **Although vegetation criteria met, no wetland hydrology or soils.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **10**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ____ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Lolium perenne***	**FAC**	**herb**	1.			
2.	***Xanthium strumarium***	**FAC+**	**herb**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ____

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Cropley Clay Loam** Subgroup (2): ____
Is the soil on the hydric soils list? Yes ____ No **X*** Undetermined ____
Is the soil a Histosol? Yes ____ No **X** Histic epipedon present? Yes ____ No **X**
Is the soil: Mottled? Yes **X** No ____ Gleyed? Yes ____ No **X**
Matrix Color: **2.5Y3/2** Mottle Colors: **Feint mottles-7.5YR4/6**
Other hydric soil indicators: **Not saturated; slightly moist.**
Is the hydric soil criterion met? Yes **X** No ____
Rationale: **Mottling**
*** Only Cropley Clay Loam soils with inclusion of Campbell soils are considered hydric.**

HYDROLOGY

Is the ground surface inundated? Yes ____ No **X** Surface water depth: ____
Is the soil saturated? Yes ____ No **X** Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation:
Below wrack line in tree; 10 ' from active water course.

Is the wetland hydrology criterion met? Yes **X** No ____
Rationale: **Within Ordinary High Water line.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **11**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Agrostis stolonifera***	**FACW**	**herb**	1.			
2.	***Baccharis pilularis***	**NL**	**herb**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **50**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale:

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YT3/2** Mottle Colors:
Other hydric soil indicators: **Water mottled vegetation in upper 3'; sandy loam soil.**
Is the hydric soil criterion met? Yes ___ No **X**
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth:
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:
Sediment deposits; water floods this area during high flows.

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: **At boundry of sediment deposits.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **Although it borders on wetland, this sampling point is not a wetland.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/14/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **12**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Agrostis stolonifera***	**FACW**	**herb**	1.			
2.	***Euthamia occidentalis***	**OBL**	**herb**	2.			
3.	***Scirpus americanus***	**OBL**	**herb**	3.			
4.	***Plantago major***	**FACW-**	**herb**	4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes **X** No ___
Matrix Color: **5Y4/1** Mottle Colors: **10YR3/3 (large); 7.5YR4/6; 2.5Y5/6 (small)**
Other hydric soil indicators: **Very dense clay deposits.**
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Low matrix chroma; mottled.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Within 2' of free water surface of creek (difficult to tell saturation because of clay).

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: ___

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **13**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes **X** No Disturbed; some fill, nails in pit; irregular surface (from concrete); pieces of rubble present.

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Cynodon dactylon***	**FAC**	**herb**	1.	***Polypogon monspeliensis***	**FACW+**	**herb**
2.	***Salix lasiolepis***	**FACW**	**shrub**	2.	***Populus fremontii***	**FACW**	**sapling**
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No

Rationale: **FAC and FACW plants dominant.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes No **X** Undetermined
Is the soil a Histosol? Yes No **X** Histic epipedon present? Yes No **X**
Is the soil: Mottled? Yes No **X** Gleyed? Yes No **X**
Matrix Color: **10YR3/3** Mottle Colors:
Other hydric soil indicators: **Rocks from small to large; average 1 1/2" diameter.**
Is the hydric soil criterion met? Yes No **X**
Rationale: **Appears to be fill; white thin surface layer from concrete?/ alkalinity?**

HYDROLOGY

Is the ground surface inundated? Yes No **X** Surface water depth:
Is the soil saturated? Yes No **X** Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:
Depressed topography; possible sediment deposits.

Is the wetland hydrology criterion met? Yes **X** No
Rationale: **Depressional topography.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **Based on hydrology and vegetation; soils disturbed.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **14**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes **X** No ___ Disturbed area; former home site.

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Cynodon dactylon***	**FAC**	**herb**	1.			
2.	***Polypogon monspeliensis***	**FACW+**	**herb**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/3** Mottle Colors: ___
Other hydric soil indicators: **Rocks and pebbles in soil.**
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: **Does not appear to pond frequently.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Slight depression.

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: ___

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **No soils or hydrology indicators for wetland.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **15**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes **X** No ___ Disturbed area; former home site.

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Cynodon dactylon***	**FAC**	**herb**	1.			
2.	***Polypogon monspeliensis***	**FACW+**	**herb**	2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/3** Mottle Colors: ___
Other hydric soil indicators: **Rocks and pebbles in soil.**
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: **Does not appear to pond frequently.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Slight depression.

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: ___

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **No soils or hydrology indicators for wetland.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **16**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes **X** No **Bank with fill from upland area; disturbances include pump, homeless shelter/lean to, dumping.**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Oryzopsis miliaceae***	**NL**	**herb**	1.	***Artemisia douglasiana***	**FACW**	**herb**
2.	***Rubus urxinus***	**FACW**	**shrub**	2.			
3.	***Populus fremontii***	**FACW**	**tree**	3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **67**
Is the hydrophytic vegetation criterion met?
Yes **X** No

Rationale:

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes No **X** Undetermined
Is the soil a Histosol? Yes No **X** Histic epipedon present? Yes No **X**
Is the soil: Mottled? Yes No **X** Gleyed? Yes No **X**
Matrix Color: **10YR3/3** Mottle Colors: **5YR4/6**
Other hydric soil indicators:
Is the hydric soil criterion met? Yes **X** No
Rationale: **Sandy; caked and craked silt deposits; mottled; chroma 3 (but entisol).**

HYDROLOGY

Is the ground surface inundated? Yes No **X** Surface water depth:
Is the soil saturated? Yes No **X** Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:
Water marks; sediment deposits, water stained levees, drainage patterns; very steep.

Is the wetland hydrology criterion met? Yes **X** No
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **17**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Agrostis stolonifera***	**FACW**	**herb**	1.	***Picris echioides***	**FAC**	**herb**
2.	***Polypogon monspeliensis***	**FACW+**	**herb**	2.			
3.	***Salix lasiolepis***	**FACW**	**tree**	3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Hydrophytic vegetation dominant.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes **X** No ___ Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: **10YR3/1 (feint); 10YR4/1**
Other hydric soil indicators: ___
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Low chroma; mottles**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Water lines; drift lines; sediment deposits; drainage patterns; caked silt 1/4" thick at surface.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: ___

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **18**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Populus fremontii***	**FACW**	**tree**	1.	***Xanthium strumarium***	**FAC+**	**herb**
2.	***Picris echioides***	**FAC**	**herb**	2.	***Typhya latifolia***	**OBL**	**herb**
3.	***Rumex crispus***	**FACW**	**herb**	3.	***Euthamia occidentalis***	**OBL**	**herb**
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **Dominant vegetation FAC and FACW.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes **X** No ___ Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/2** Mottle Colors: **5YR4/6; 5YR 5/8 many mottles**
Other hydric soil indicators: **1" of recent silt deposits (caked together).**
Is the hydric soil criterion met? Yes **X** No ___
Rationale: **Mottled.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Water marks; drift lines; sediment deposits; drainage patterns; water stained levees; 3' from water surface.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **All three criteria met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **19**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

	Dominant Plant Species	Indicator Status	Stratum		Subdominant Plant Species	Indicator Status	Stratum
1.	***Populus fremontii***	**FACW**	**tree**	1.			
2.	***Oryzopsis miliaceae***	**NL**	**herb**	2.			
3.	***Artemisia douglasiana***	**FACW**	**herb**	3.			
4.	***Silybum marianum***	**NL**	**herb**	4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			

Percent of dominant species that are OBL, FACW, and/or FAC: **50**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: **FACW plants present.**

SOILS

Series/phase: **Mocho Loam** Subgroup (2):
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: **10YR3/3** Mottle Colors:
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ___ No **X**
Rationale: **Does not appear to be frequently flooded.**

HYDROLOGY

Is the ground surface inundated? Yes ___ No **X** Surface water depth:
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation:
Sediment deposits; site at upper end of siltation line.

Is the wetland hydrology criterion met? Yes ___ No **X**
Rationale: **Above Ordinary High Water line.**

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **No**
Rationale for jurisdictional decision: **Although hydrophytic vegetation present, wetland soil and hydrology criteria not met.**

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD (1)

Field Investigator(s): **Beth Chambers/ CH2M HILL and Mara Noelle/HRG** Date: **7/15/93**
Project/Site: **Coyote Creek-Reach 3** State: **CA** County: **Alameda**
Applicant/Owner: **Santa Clara Valley Water District** Plant Community #/Name: **20**

Note: If a more detailed site description is necessary, use the back of the form or a field notebook.
Do normal environmental conditions exist at the plant community?
Yes **X** No ___ (If no, explain on back.)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ___ No **X**

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Subdominant Plant Species	Indicator Status	Stratum
1. ***Xanthium strumarium***	**FAC+**	**herb**	1.		
2. ***Typha latifolia***	**OBL**	**herb**	2.		
3. ***Eurthamia ocidentalis***	**OBL**	**herb**	3.		
4. ***Populus fremontii***	**FACW**	**sapling**	4.		
5.			5.		
6.			6.		
7.			7.		
8.			8.		
9.			9.		
10.			10.		

Percent of dominant species that are OBL, FACW, and/or FAC: **100**
Is the hydrophytic vegetation criterion met?
Yes **X** No ___

Rationale: ___

SOILS

Series/phase: **Mocho Loam** Subgroup (2): ___
Is the soil on the hydric soils list? Yes ___ No **X** Undetermined ___
Is the soil a Histosol? Yes ___ No **X** Histic epipedon present? Yes ___ No **X**
Is the soil: Mottled? Yes ___ No **X** Gleyed? Yes ___ No **X**
Matrix Color: ___ Mottle Colors: ___
Other hydric soil indicators: ___
Is the hydric soil criterion met? Yes ___ No ___
Rationale: **Soils not characterized. No pit dug; form to characterize vegetative conditions only.**

HYDROLOGY

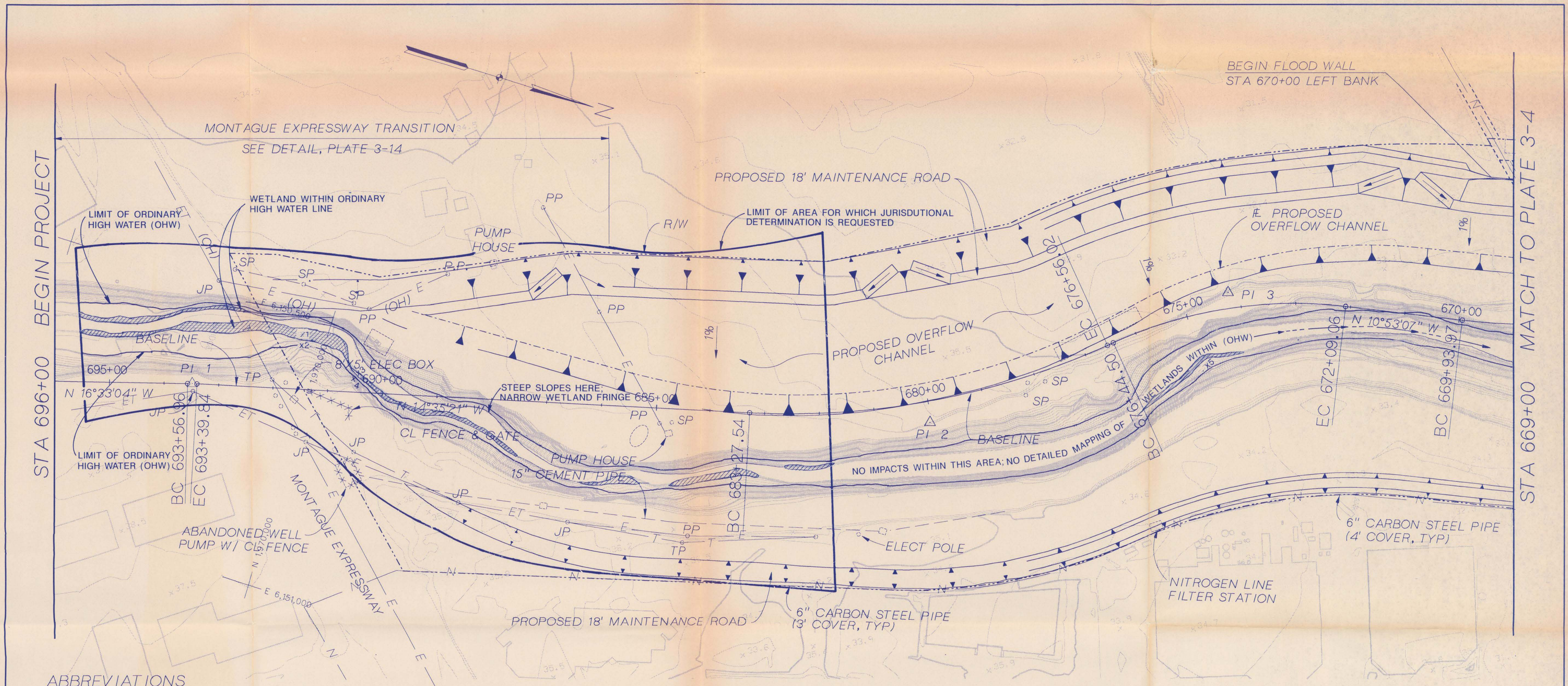
Is the ground surface inundated? Yes ___ No **X** Surface water depth: ___
Is the soil saturated? Yes ___ No **X** Depth to free-standing water in pit/soil probe hole: ___
List other field evidence of surface inundation or soil saturation:
Sediment deposits; drainage patterns and drift lines present.

Is the wetland hydrology criterion met? Yes **X** No ___
Rationale: ___

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? **Yes**
Rationale for jurisdictional decision: **Obligate wetland vegetation adjacent to creek.**

Attachment B
Maps of Jurisdictional Areas and Sampling Points (Plates 1-6)



STA 696+00 BEGIN PROJECT
STA 669+00 MATCH TO PLATE 3-4
N
MONTAGUE EXPRESSWAY TRANSITION
SEE DETAIL, PLATE 3-14
BEGIN FLOOD WALL
STA 670+00 LEFT BANK
PROPOSED 18' MAINTENANCE ROAD
LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION IS REQUESTED
℄ PROPOSED OVERFLOW CHANNEL
LIMIT OF ORDINARY HIGH WATER (OHW)
WETLAND WITHIN ORDINARY HIGH WATER LINE
PUMP HOUSE
R/W
PP
SP
JP
(OH)
E
BASELINE
695+00
PI 1
TP
N 16°33'04" W
8'X5' ELEC BOX
690+00
N 14°35'21" W
STEEP SLOPES HERE; NARROW WETLAND FRINGE
685+00
1%
PROPOSED OVERFLOW CHANNEL
680+00
PI 2
BASELINE
NO IMPACTS WITHIN THIS AREA; NO DETAILED MAPPING OF WETLANDS WITHIN (OHW)
675+00
PI 3
670+00
N 10°53'07" W
EC 676+56.02
BC 676+44.50
EC 672+09.06
BC 669+93.97
BC 693+56.96
EC 693+39.84
BC 688+27.54
LIMIT OF ORDINARY HIGH WATER (OHW)
CL FENCE & GATE
PUMP HOUSE
15" CEMENT PIPE
ABANDONED WELL
PUMP W/ CL FENCE
MONTAGUE EXPRESSWAY
ET
T
N
ELECT POLE
NITROGEN LINE FILTER STATION
6" CARBON STEEL PIPE (4' COVER, TYP)
6" CARBON STEEL PIPE (3' COVER, TYP)
PROPOSED 18' MAINTENANCE ROAD
E 6,150,500
E 6,151,000
N 1,970,000

ABBREVIATIONS

BC	BEGINNING OF CURVE
CMP	CORRUGATED METAL PIPE
EC	END OF CURVE
EL/ELEV	ELEVATION
EXIST	EXISTING
INV	INVERT
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NTS	NOT TO SCALE
MH	MANHOLE
PI	POINT OF INTERSECTION
R/W	RIGHT-OF-WAY
STA	STATION
PP	POWER POLE
TP	TELEPHONE POLE
JP	JOINT POLE
OH	OVERHEAD
SP	STAND PIPE
IP	IRRIGATION PIPE
CL	CHAIN LINK
CONC	CONCRETE

LEGEND

——— — — — ———	NATURAL CHANNEL FLOWLINE
——— — — — ———	OVERFLOW CHANNEL INVERT
——— — — — ———	RIGHT-OF-WAY
—— W ——	WATER LINE
—— G ——	GAS LINE
—— T ——	TELEPHONE LINE
—— E ——	ELECTRIC LINE
—— N ——	NITROGEN GAS LINE
—— ET ——	ELECTRIC & TELEPHONE LINE
—X——X—	CHAIN LINK FENCE
—— SD ——	STORM DRAIN LINE
△	POINT OF INTERSECTION (PI)
-------------------	EXIST EASEMENT

BASELINE CONTROL

PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 1			1,969,790.51	6,150,680.96	01°57'43"	500'	17.12'	8.56'
	N 14°35'21" W	1363.20'						
PI 2			1,971,109.76	6,150,337.59	27°28'56"	1400'	671.52'	342.35'
	N 42°04'17" W	577.13'						
PI 3			1,971,538.17	6,149,950.88	31°11'10"	800'	435.44'	223.26'
	N 10°53'07" W	1032.82'						

/USR2/SFO31213/DLV/COYP003.DGN 01-29-92

GENERAL NOTES (PLATES 3-3 THRU 3-8):

1. ELEVATIONS REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND ARE BASED ON SANTA CLARA VALLEY WATER DISTRICT BENCH MARKS: 64 AND 254 AND NGS BENCH MARKS G-148 AND COYOTE.
2. GRID COORDINATES REFER TO THE NORTH AMERICAN DATUM 1983 CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE-3 ALL DISTANCES ARE GROUND LEVEL DISTANCES.
3. PROFILE STATIONING IS MEASURED ALONG THE BASELINE.
4. "LEFT" AND "RIGHT" REFERS TO LOOKING DOWN STREAM.
5. Q(1%) = 14,500 CFS; N=0.07 IN EXISTING CHANNEL & REVEGETATION AREAS; N=0.035 IN OVERFLOW CHANNELS & ROCK LINED AREAS.
6. ARMORING AGGREGATE SHALL BE PLACED 1' THICK ON MAINTENANCE ROADS INSIDE CHANNEL AS SHOWN ON PLAN.
7. PROPOSED RAMPS TO BE CONSTRUCTED AT 10% GRADE.
8. EASEMENT RESERVED FOR PUBLIC AND UTILITY PURPOSES, TASMAN DRIVE.

LEGEND

▨	WETLAND
———	ORDINARY HIGH WATER (OHW) LINE
x12	SAMPLING LOCATION
━━━	LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION REQUESTED

GRAPHIC SCALE

1" = 200'

0 50' 100' 200' 300' 400' 500'

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
LIMIT OF JURISDICTIONAL WETLANDS AND WATERS

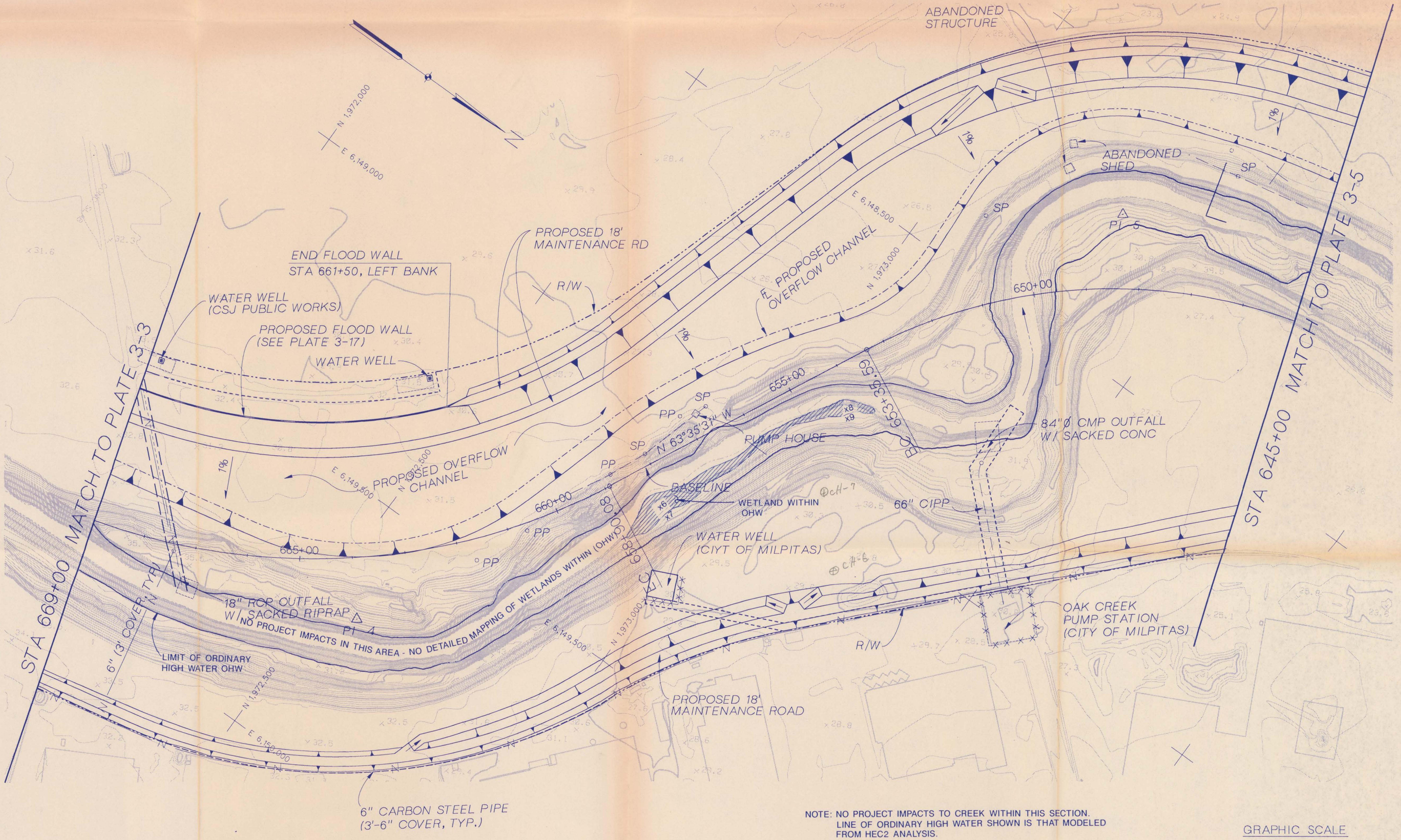
PLAN
(STA 696+00 - STA 669+00)

FILE NO. CO-9-10

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
FEB. 1992

PLATE 1



NOTE: NO PROJECT IMPACTS TO CREEK WITHIN THIS SECTION.
LINE OF ORDINARY HIGH WATER SHOWN IS THAT MODELED FROM HEC2 ANALYSIS.

GRAPHIC SCALE

1" = 200' 0 50' 100' 200' 300' 400' 500'

BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	Δ	R	L	T
PI 4			1,972,552.41	6,149,755.84	52°42'24"	1200'	1103.89'	594.47'
	N 63°35'31" W	1636.67'						
PI 5			1,973,280.34	6,148,289.96	51°59'53"	1000'	907.54'	487.71'
	N 11°35'38" W	960.98'						

LEGEND

▨	WETLAND
―	ORDINARY HIGH WATER (OHW) LINE
x12	SAMPLING LOCATION
━	LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION REQUESTED

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

LIMIT OF JURISDICTIONAL WETLANDS AND WATERS

PLAN
(STA 669+00 - STA 645+00)

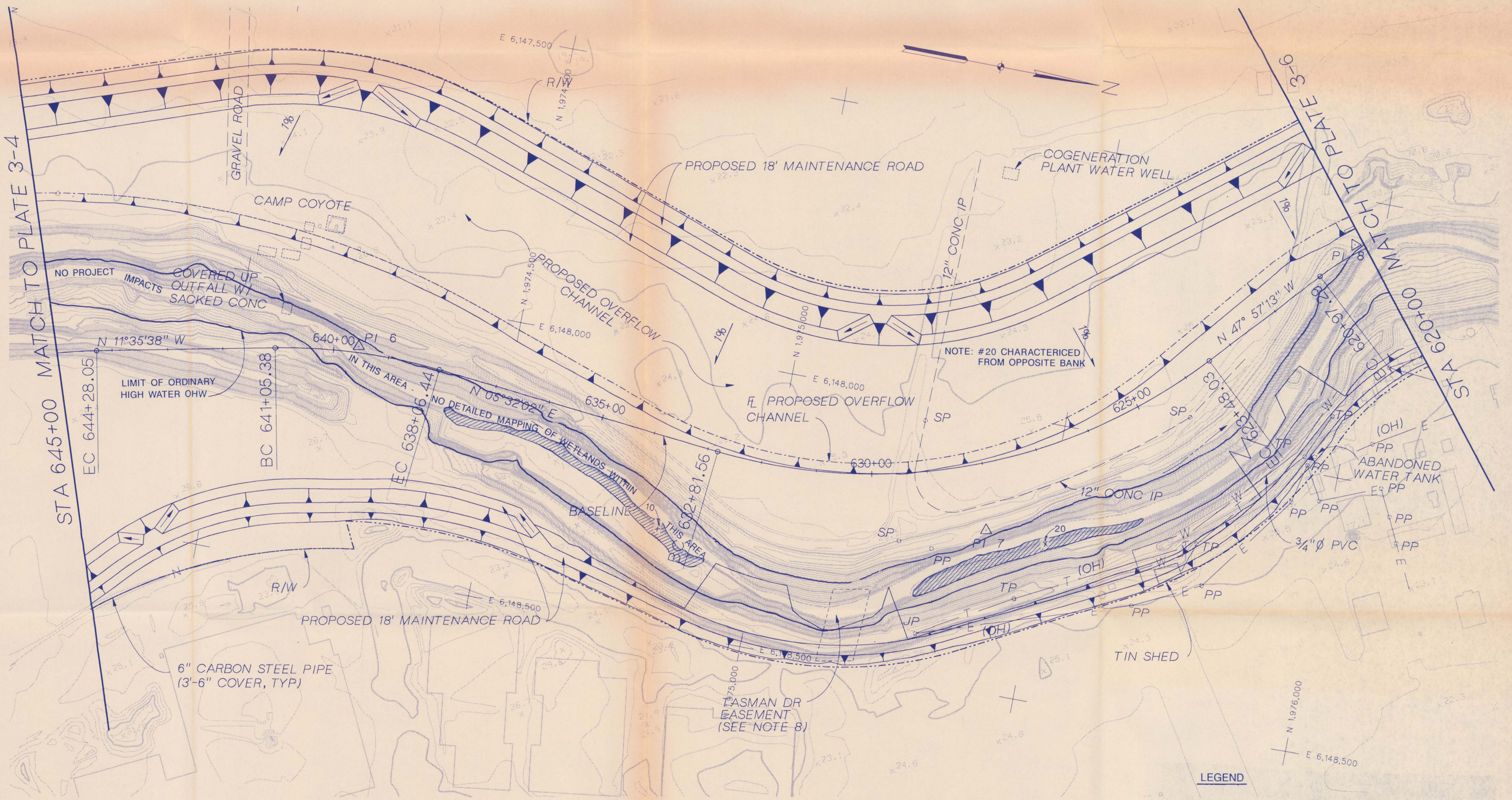
FILE NO. CO-9-10

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
FEB. 1992

PLATE 2

/USR2/SFO31213/DLV/COYP004.DGN 01-29-92



NOTE: NO IMPACTS TO CREEK WITHIN THIS SECTION.
LINE OF ORDINARY HIGH WATER SHOWN IS THAT MODELED FROM HEC2.

LEGEND

▨	WETLAND
―	ORDINARY HIGH WATER (OHW) LINE
x12	SAMPLING LOCATION
━	LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION REQUESTED

GRAPHIC SCALE

0 50' 100' 200' 300' 400' 500'

1" = 200'

BASELINE CONTROL

PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	Δ	R	L	T
PI 6			1,674,221.71	6,148,096.83	17°07'39"	1000'	298.93'	150.59'
	N 05°32'02" E	1179.38'						
PI 7			1,975,395.59	6,148,210.56	53°29'14"	1000'	933.53'	503.90'
	N 47°57'13" W	868.94'						
PI 8			1,975,977.55	6,147,565.28	25°45'12"	500'	224.74'	114.30'
	N 22°12'01" W	202.97'						

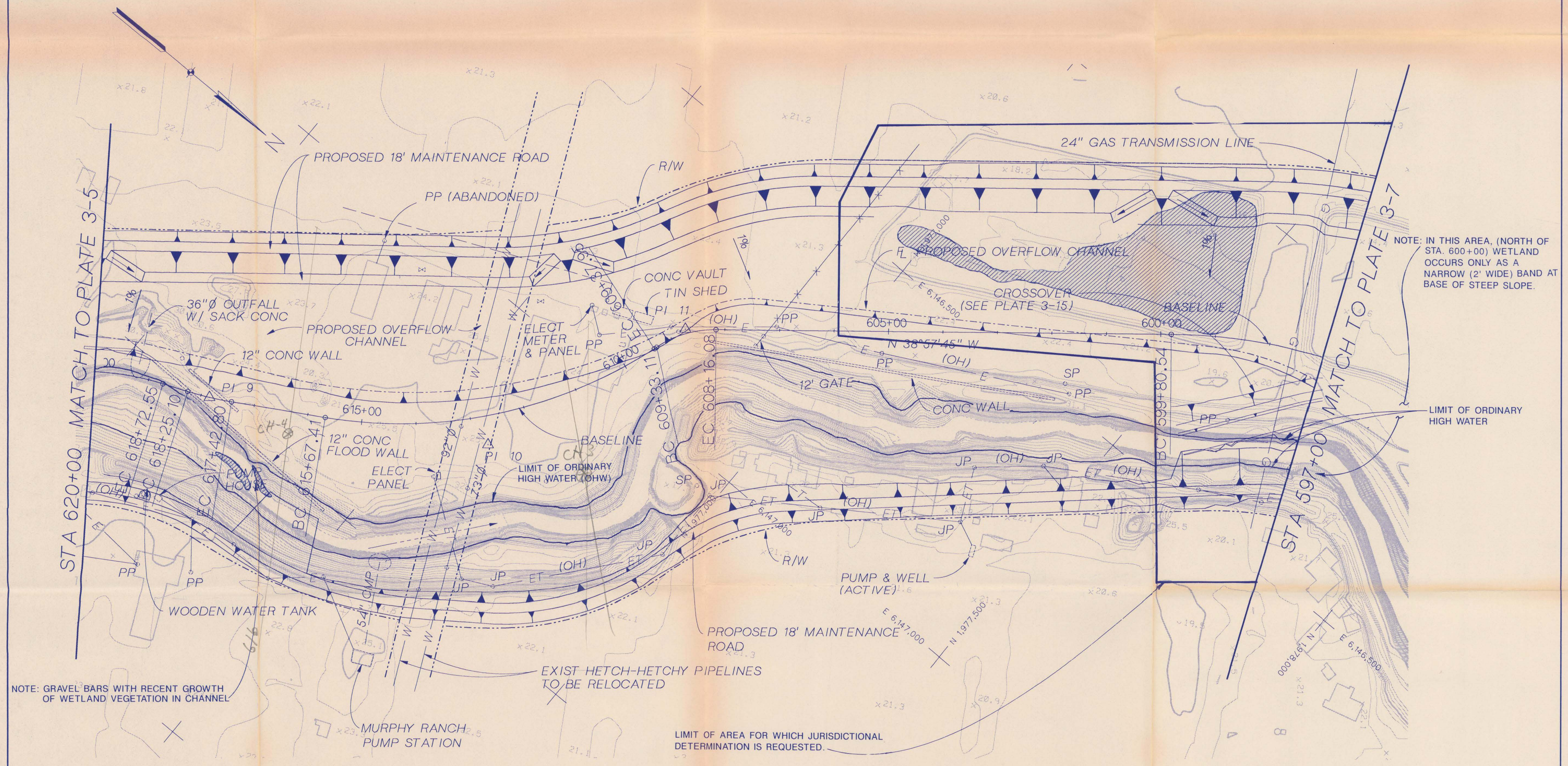
COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
LIMIT OF JURISDICTIONAL WETLANDS AND WATERS
PLAN
(STA 645+00 - STA 620+00)

FILE NO. CO-9-10

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
FEB. 1992

PLATE 3



NOTE: GRAVEL BARS WITH RECENT GROWTH OF WETLAND VEGETATION IN CHANNEL

NOTE: IN THIS AREA, (NORTH OF STA. 600+00) WETLAND OCCURS ONLY AS A NARROW (2' WIDE) BAND AT BASE OF STEEP SLOPE.

LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION IS REQUESTED.

NOTE: NO IMPACTS TO CREEK UP TO APPROXIMATELY STATION 600+00. ORDINARY HIGH WATER LINE TAKEN FROM MODELED OUT PUT OF HEC2 UP TO STATION 600+00.

LEGEND

▨	WETLAND
—	ORDINARY HIGH WATER (OHW) LINE
x12	SAMPLING LOCATION
—	LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION REQUESTED

BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 9			1,976,165.47	6,147,488.59	7°51'35"	600'	82.31'	41.22'
	N 30°03'36" W	546.55'						
PI 10			1,976,638.51	6,147,214.82	42°25'46"	850'	629.45'	329.94'
	N 72°29'21" W	395.04'						
PI 11			1,976,757.37	6,146,838.09	33°31'37"	200'	117.03'	60.24'
	N 38°57'45" W	2024.52'						

GRAPHIC SCALE
0 50' 100' 200' 300' 400' 500'
1" = 200'

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
LIMIT OF JURISDICTIONAL WETLANDS AND WATERS

PLAN
(STA 620+00 - STA 597+00)

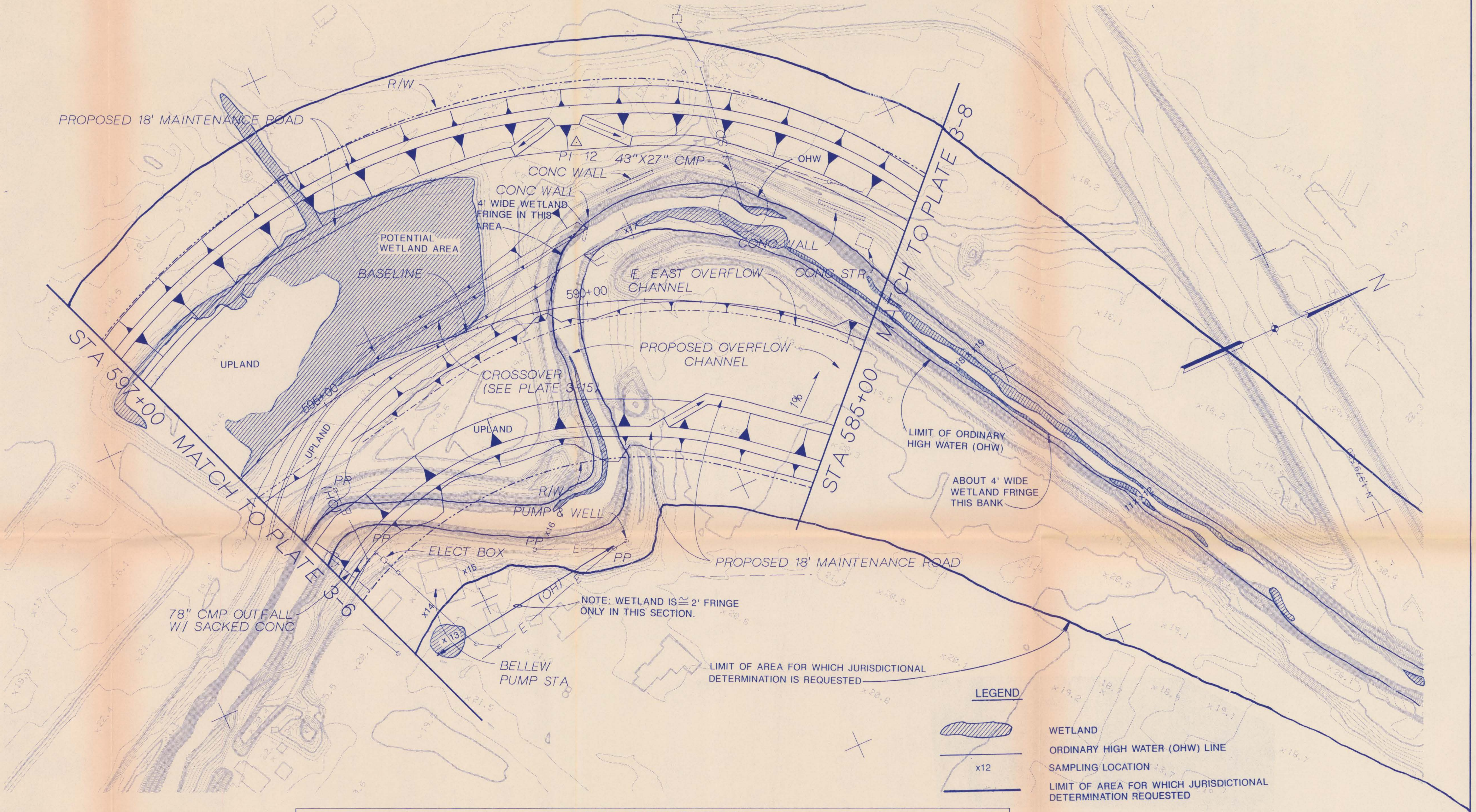
FILE NO. CO-9-10

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
FEB. 1992

PLATE 4

/USR2/SFO31213/DLV/COYP006.DGN 01-29-92


PROPOSED 18' MAINTENANCE ROAD
R/W
PI 12
43"X27" CMP
CONC WALL
CONC WALL
4' WIDE WETLAND FRINGE IN THIS AREA
POTENTIAL WETLAND AREA
BASELINE
OHW
CONC WALL
CONC STR.
℄ EAST OVERFLOW CHANNEL
590+00
PROPOSED OVERFLOW CHANNEL
CROSSOVER (SEE PLATE 3-15)
UPLAND
UPLAND
UPLAND
595+00
STA 597+00 MATCH TO PLATE 3-6
STA 585+00
MATCH TO PLATE 3-8
N
LIMIT OF ORDINARY HIGH WATER (OHW)
ABOUT 4' WIDE WETLAND FRINGE THIS BANK
PP
R/W
PUMP & WELL
PP
ELECT BOX
PP
PP
PROPOSED 18' MAINTENANCE ROAD
78" CMP OUTFALL W/ SACKED CONC
NOTE: WETLAND IS ≅ 2' FRINGE ONLY IN THIS SECTION.
BELLEW PUMP STA
LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION IS REQUESTED
x13
x14
x15
x16
x17
x18
x19
196

LEGEND

▨	WETLAND
—	ORDINARY HIGH WATER (OHW) LINE
x12	SAMPLING LOCATION
—	LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION REQUESTED

BASELINE CONTROL

PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 12			1,978,331.55	6,145,565.05	96°55'18"	1000'	1691.60'	1128.74'
	N 57°57'33" E	3117.48'						
PI 13			1,979,985.45	6,148,207.64	99°24'52"	500'	867.55'	589.73'

GRAPHIC SCALE

0 50' 100' 200' 300' 400' 500'

1" = 200'

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

LIMIT OF JURISDICTIONAL WETLANDS AND WATERS

PLAN

(STA 597+00 - STA 585+00)

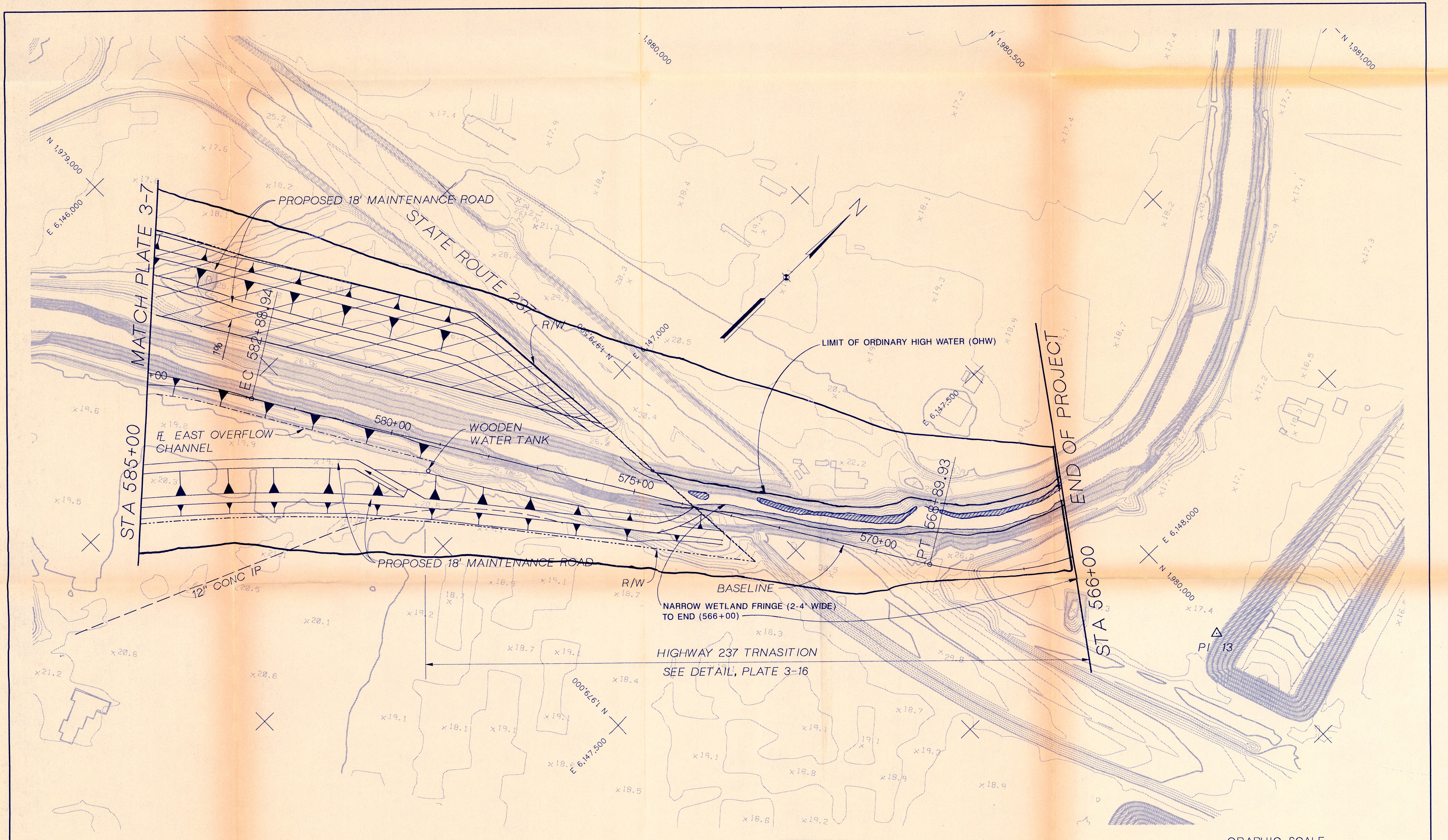
FILE NO. CO-9-10

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
FEB. 1992

PLATE 5

/USR2/SFO31213/DLV/COYP007.DGN 01-29-92



BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 12			1,978,331.55	6,145,565.05	96°55'18"	1000'	1691.60'	1128.74'
	N 57°57'33" E	3117.48'						
PI 13			1,979,985.45	6,148,207.64	99°24'52"	500'	867.55'	589.73'

LEGEND

▨	WETLAND
—	ORDINARY HIGH WATER (OHW) LINE
x12	SAMPLING LOCATION
━	LIMIT OF AREA FOR WHICH JURISDICTIONAL DETERMINATION REQUESTED

GRAPHIC SCALE

1" = 200' 0 50' 100' 200' 300' 400' 500'

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
LIMIT OF JURISDICTIONAL WETLANDS AND WATERS

PLAN
(STA 585+00 - STA 566+00)

FILE NO. CO-9-10

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
FEB. 1992

PLATE 6

/USR2/SFO31213/DLV/COYP008.DGN 01-29-92

Attachment C
USGS Quadrangle Map

APPENDIX C

HABITAT MITIGATION AND MONITORING PROGRAM
COYOTE CREEK--REACH 3
SANTA CLARA, CALIFORNIA

Excerpted from Appendix D of the Final General Design Memorandum, Coyote and Berryessa Creeks, California, Coyote Creek, (GDM, 1993)

Contents

Page

1. **Reach 3 Mitigation Planting Design and Establishment Program** C-1
   1.1 Introduction C-1
   1.2 Pilot Study Results C-1
   1.3 Revegetation Areas C-2
   1.4 Soil and Groundwater Testing C-9
   1.5 Plant Species C-10
   1.6 Plant Material Acquisition C-10
   1.7 Site Preparation and Schedule C-14
   1.8 Planting Techniques C-16
   1.9 Irrigation C-33
   1.10 Plant Maintenance Requirements and Records C-34
   1.11 Plant Replacement Requirements C-35
   1.12 Maintenance Records C-36
   1.13 Contingency Measures C-36

2. **Mitigation monitoring plan** C-38
   2.1 Reach 1 Marsh Area Monitoring C-38
   2.2 Riparian Revegetation Monitoring C-39
   2.3 Establishment Period Monitoring Plan, Reach 3 . . . . C-39
   2.4 Fisheries Mitigation Monitoring Program C-41

3. **References** C-43

Attachment A: Pilot Study Results Discussion 1
   A.1 Propagule Types 1
   A.2 Plant Installation 3
   A.3 Irrigation Methods 4

Tables

C-1 Plant Associations of the Pilot Revegetation Project C-2
C-2 Summary of Species Planted in the Pilot Revegetation Project C-3
C-3 Plant Species Suitable for Revegetation of the Upper Slope of Crossover Areas C-8
C-4 Preliminary List of Species To Be Planted in Reach 3 . . . . C-11
C-5 Preliminary List of Propagule or Nursery Stock To Be Planted in Reach 3 . . . . C-13

Tables
(Continued)

Number **Page**

C-6 Native Grass and Herbaceous Species Suitable for Revegetation in the Crossover Area C-15
C-7 Preliminary Revegetation Site 3 Species and Density Plan C-18
C-8 Preliminary Revegetation Site 4 Species and Density Plan C-19
C-9 Preliminary Revegetation Site 5 Species and Density Plan C-20
C-10 Preliminary Revegetation Site 6 Species and Density Plan C-21
C-11 Preliminary Revegetation Site 7 Species and Density Plan C-22
C-12 Noxious Plant Species Potentially Occurring in Reach 3 . . . . . C-31

Figures

C-1 Planting Detail C-4
C-2 Planting Detail C-5
C-3 Planting Detail C-6
C-4 Cutting on Level Ground C-24
C-5 Cutting on Slope C-25
C-6 Container Plant on Level Ground C-26
C-7 Container Plant on Slope C-27
C-8 Multiple Planting of Perennials C-28
C-9 Plant Protection Detail A C-29
C-10 Plant Protection Detail B C-30

Plates

C-1 Mitigation Measures
C-2 Mitigation Measures
C-3 Mitigation Measures
C-4 Mitigation Measures
C-5 Mitigation Measures

Appendix C

Mitigation and Monitoring Program

1. Reach 3 Mitigation Planting Design and Establishment Program

A Pilot Revegetation Site was established in 1986 to 1987 in Reach 2 at Site 1. (See the Coyote and Berryessa Creeks, California, Coyote Creek, Final General Design Memorandum, (GDM), Figure 6-1). This 4-acre site was designed and planted with riparian species and serves as a test site for revegetation techniques, including irrigation methods, plant species mix, and plant materials. The results of the first 3 years of intensive plant monitoring data were summarized in a report to the Santa Clara Valley Water District (Water District) at the beginning of September 1991; a draft copy of that report was then provided to the U.S. Army Corps of Engineers (Corps). In preparing the mitigation planting design, the results of the pilot study were reviewed to determine the appropriate techniques and materials for additional riparian revegetation of Reach 3. Information on successful techniques was gathered from other projects in the area and from revegetation specialists and native plant nurseries in the area. The preliminary results were inconclusive for certain issues, species, propagule types, and techniques. Where the pilot study results were ambiguous, recommendations were made based on experience at other planting sites in the Bay area and elsewhere.

1.1 Introduction

The revegetation design and the monitoring plan for Lower Coyote Creek have been developed based on the results of the 4-acre pilot study implemented in the winter of 1986 to 1987. The objective of the pilot study was to revegetate 4 acres of riparian forest to determine the most successful and cost-effective revegetation methods for maximizing plant survival; these methods could then be used in the remaining revegetation sites at Coyote Creek.

The objective of the revegetation effort along Lower Coyote Creek is to replace riparian habitat lost due to flood facilities construction. Habitat lost by the flood control project shall be replaced in kind and with no net loss. The U.S. Fish and Wildlife Service (USFWS) has calculated that, over the projected 100-year lifespan of the project, an estimated 32.5 acres of revegetated area is sufficient to replace all habitat lost by construction activities. Of this area, 20.3 acres are planned for Reach 3. In addition to these 20.3 acres of riparian revegetation, plantings are planned in setback areas, in crossover areas (where the overflow channel crosses over the existing channel), and in fishery shade mitigation plantings.

1.2 Pilot Study Results

The final revegetation design and establishment program for the remaining five planting sites along Coyote Creek is modeled after the pilot study (Site 1) implemented in of 1986 to 1987. The pilot study tested a total of 15 riparian species. Eight of the 15 species were represented in the following 3 plant associations: the Sycamore (*Platanus racemosa*) Association, the Box elder (*Acer negundo*) Association, and the Valley oak (*Quercus lobata*) Association. Table C-1 shows the species contained within each plant association. Riparian species not included in the plant associations, or required in greater number than were included in the three plant associations, were planted as individuals or in single species groves to imitate patterns of a natural riparian forest (see Table C-2). For the same reason, shrub and groundcover species were planted within, and connecting, the plant associations and single species groves.

Table C-1
Coyote Creek
Plant Associations of the Pilot Revegetation Project

Plant Association	Zone 1	Zone 2
Sycamore Association	60% Sycamore 5% Ash 10% Elderberry 20% Box Elder 5% Bay	70% Sycamore 20% Elderberry 10% Bay
Box Elder Association	50% Box Elder 20% Elderberry 15% Ash 15% Bay	60% Box Elder 30% Elderberry 10% Bay
Valley Oak Association	0%	70% Valley Oak 10% Black Walnut 5% Ash 10% Elderberry 5% Willow

These plant associations and the list of riparian species are modeled after existing riparian forest habitat along Coyote Creek and other similar streams in the region (HRG, 1991). Attachment A includes a discussion of pilot study results for planting techniques, propagule types, and irrigation methods.

1.3 Revegetation Areas

The proposed revegetation sites in Reach 3 lie directly adjacent to existing streamside vegetation, between the riparian vegetation and the edge of the overflow channel or the edge of the new levee. The five (originally four) sites to be revegetated are presently cultivated or have been cultivated recently. Much of the area is currently covered by crops or ruderal vegetation. Areas to be revegetated fall into four categories: (1) riparian habitat replacement plantings totaling 20.3 acres in Reach 3; (2) crossover area plantings, where the overflow channel crosses from the west side to the east side of the existing channel;

(3) setback areas, defined as narrow strips between the overflow channel and the existing vegetation that are not already part of a revegetation area; and (4) shade plantings for fishery mitigation in areas where existing vegetation near the creek is more open.

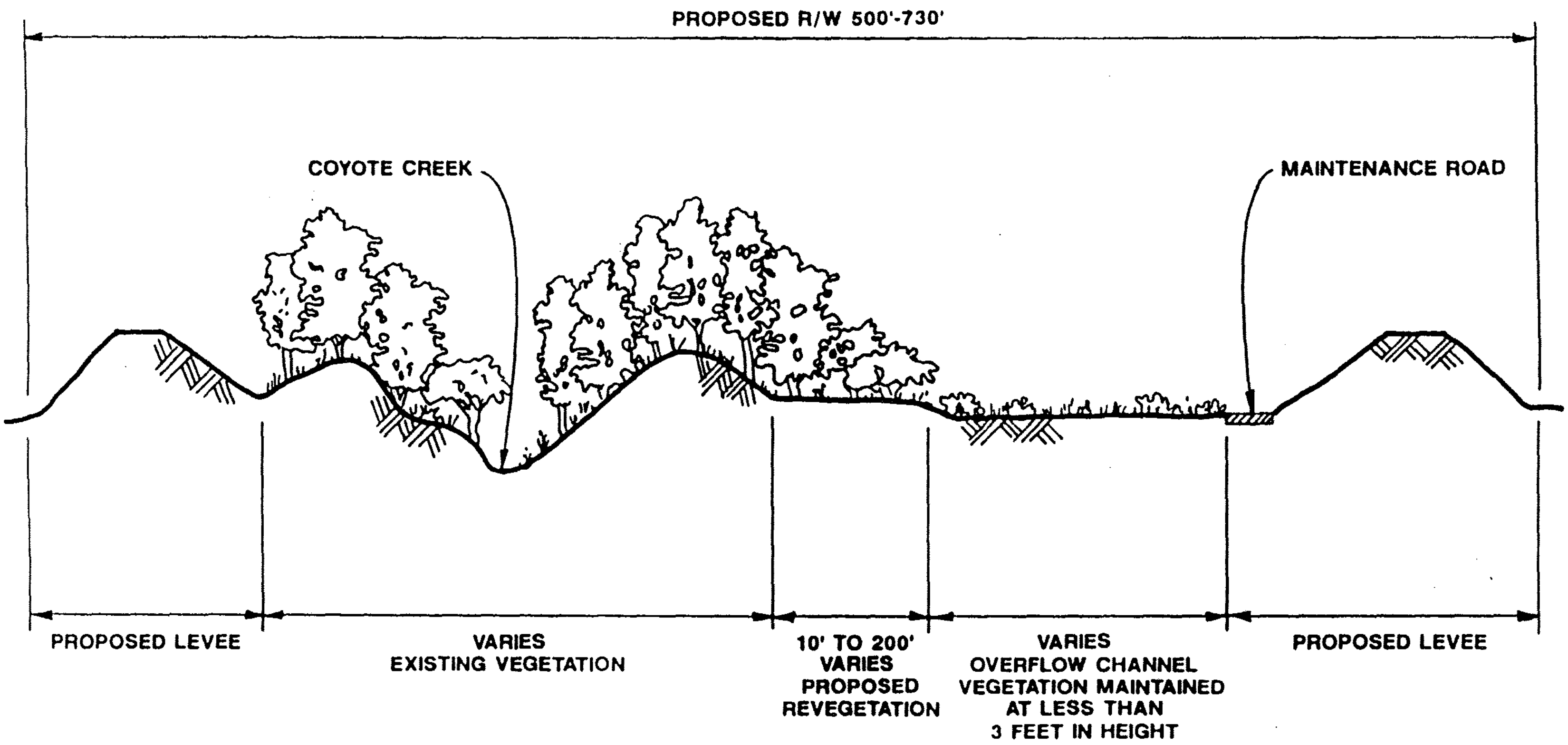
Table C-2
Coyote Creek
Summary of Species Planted in the Pilot Revegetation Project

Scientific Name	Common Name
Acer negundo ssp. californicum	California Box Elder
Alnus rhombifolia	White Alder
Juglans hindsii	California Black Walnut
Platanus racemosa	Western Sycamore
Populus fremontii	Fremont Cottonwood
Quercus agrifolia	Coast Live Oak
Quercus lobata	Valley Oak
Salix sp.	Willow
Sambucus mexicana	Blue Elderberry
Umbellularia californica	California Bay
Fraxinus latifolia	Oregon Ash
Rubus vitifolius	California Blackberry
Rosa californica	California Rose
Artemisia douglasiana	Mugwort

Fishery shade mitigation and setback areas will require further definition during the preparation of final design plans, but species from the mix proposed in the riparian replacement plantings should be used. The crossover area will require a special mix, as discussed in Section 1.3.2, Crossover Areas, since vegetation here must not exceed 3 feet in height above the level of the overflow channel. Typical planting details are shown on Figures C-1 through C-3.

1.3.1 Riparian Habitat Along Lower Coyote Creek

Reach 2 of Lower Coyote Creek was planned to include two planting areas totaling 12.2 acres: Site 1 (the 4-acre pilot revegetation study area) and Site 2. Post-construction conditions reduced Site 2 to only 7 acres instead of 8, as originally thought. An additional acre of land will be planted to the west of the pilot study (Site 1) to make up the total



PLANTING DETAIL

STATION 589 TO 637

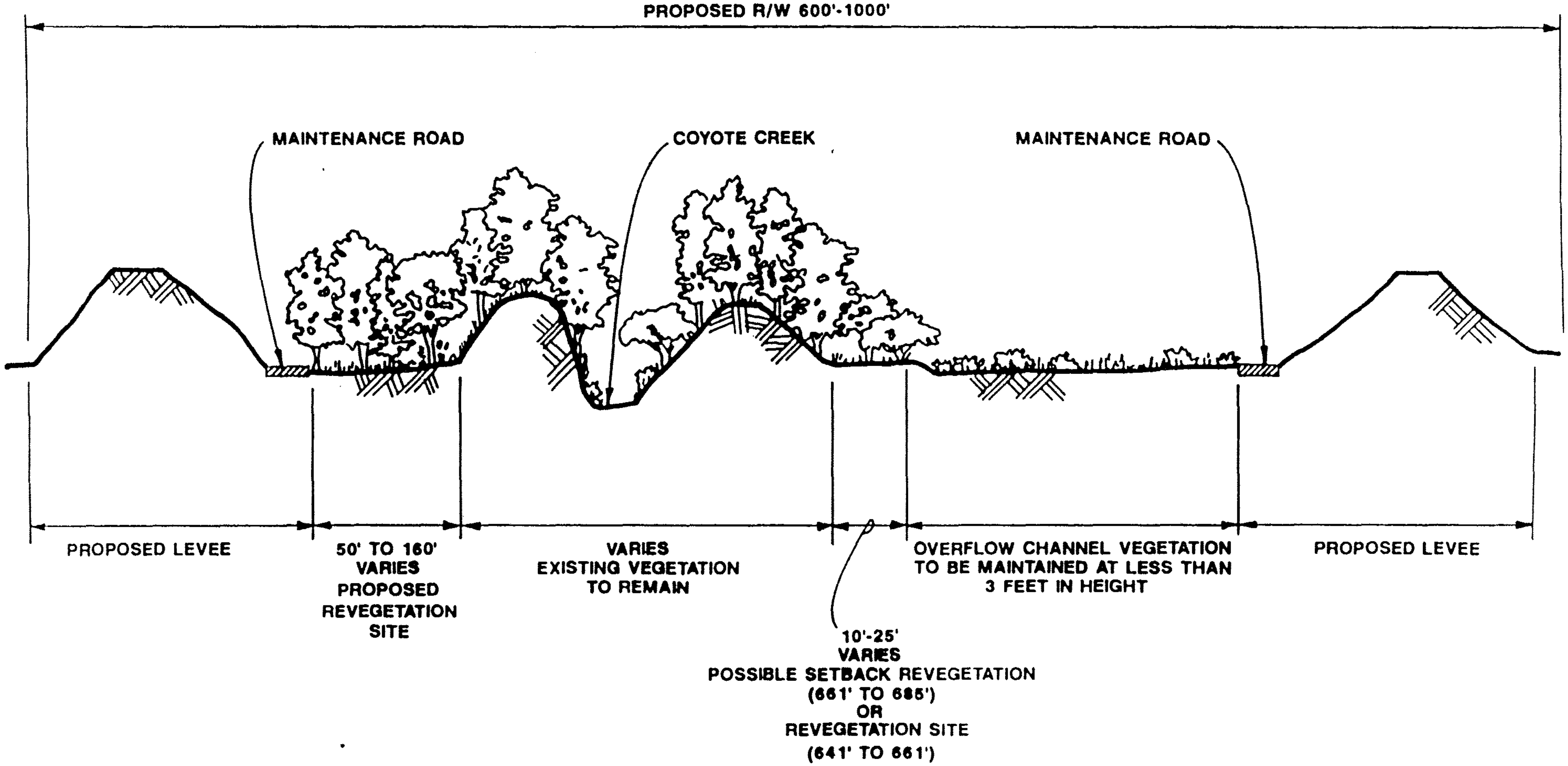
NOT TO SCALE

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-1
PLANTING DETAIL

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993


PROPOSED R/W 600'-1000'
MAINTENANCE ROAD
COYOTE CREEK
MAINTENANCE ROAD
PROPOSED LEVEE
50' TO 160' VARIES PROPOSED REVEGETATION SITE
VARIES EXISTING VEGETATION TO REMAIN
OVERFLOW CHANNEL VEGETATION TO BE MAINTAINED AT LESS THAN 3 FEET IN HEIGHT
PROPOSED LEVEE
10'-25' VARIES POSSIBLE SETBACK REVEGETATION (661' TO 685') OR REVEGETATION SITE (641' TO 661')

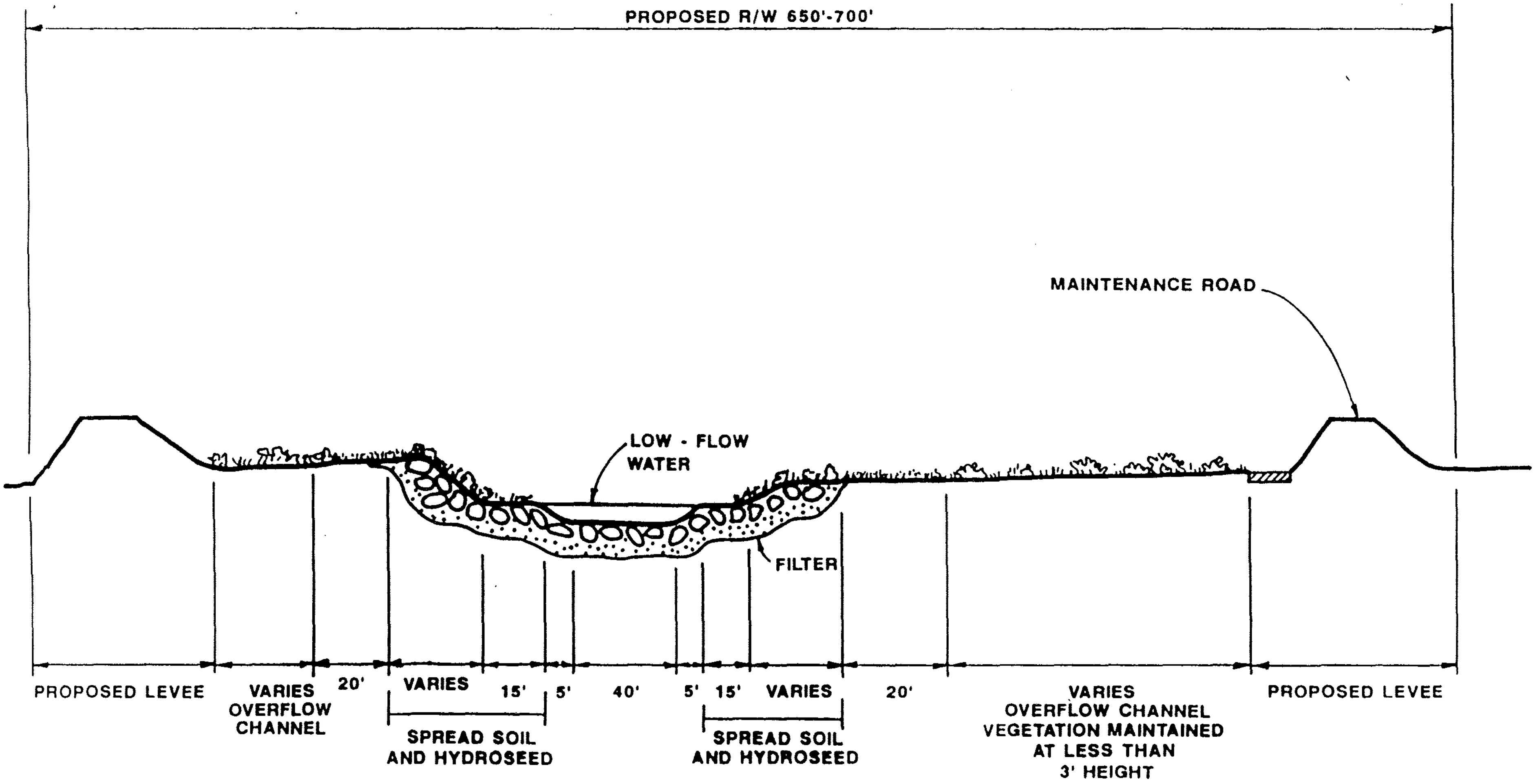
PLANTING DETAIL
STATION 637 TO 684
NOT TO SCALE

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-2
PLANTING DETAIL

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993



CROSSOVER AREA PLANTING DETAIL

STATION 590 TO 600
NOT TO SCALE

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-3
PLANTING DETAIL

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

acreage of 12.2 acres in Reach 2. This site is referred to as Site 2A, and it will be planted at the same time as Site 2. Reach 3 requires planting areas totaling 20.3 acres. Sites 3, 4, 5, and 6 (See Plates C-1 through C-6) were originally proposed as having sufficient acreage. Design modifications and new information shows that insufficient area is available in these four sites; therefore, a portion of Site 7, as shown in Plates C-1 through C-6, will also be used.

Three of the revegetation sites (3, 4, and 5) are located adjacent to the west side of the existing riparian corridor, between the riparian vegetation and the edge of the overflow channel. The two remaining sites (6 and a portion of 7) are located on the east side of the creek, between existing vegetation and the new levee. These sites are relatively flat. Their approximate acreage is shown below. The suitability of these additional areas will be verified in the field.

Site Name	Stations (Approximate)	Size in Acres (Approximate)	Comments
Site 3	West 597+00 to 609+00	2.0	Includes an extra 0.3 acres to the south, between original Sites 3 and 4
Site 4	West 610+00 to 618+00	2.5	
Site 5	West 621+00 to 639+00	4.2	
Site 6	East 637+00 to 662+00	8.1	
Site 7	East 662+00 to 684+00	3.5	The total Site 7 area is about 4.7 acres; only a portion is needed for Corps revegetation
Total Area		20.3	

1.3.2 Crossover Areas

One crossover area (areas in which the overflow channel crosses the existing channel) is found in Reach 3, between Stations 600+00 and 590+00. Crossover areas result in permanent gaps in the existing riparian corridor. For crossover areas, the goal is to develop a riparian substory to facilitate the movement of animals through breaks in the riparian corridor without restricting flow in the overflow channel. These areas shall be planted using native shrubs and groundcovers. Refer to Table C-3 for a list of species to be used in crossover revegetation.

In Reach 2, crossover area plantings installed according to the methodology described in the Coyote Creek and Berryessa Creek Feasibility Report/Environmental Impact Statement (FR/EIS), were not successful. Under that plan, the crossover areas were to include a 15-foot bench halfway up the slope, with soil worked into the riprap and placed to 10 inches on top of the riprap. The topsoil placed in the riprap washed out during flood events, and the remaining soil is subject to heavy erosion. To rectify this unsuccessful revegetation effort. The Water District has moved the plantings to a 15-foot strip at the top of the bank, behind the riprap area. This provides for low (less than 3 feet) cover for wildlife movement along the corridor. This strip is being planted with California blackberry (*Rubus vitifolius*) and beardless wildrye (*Elymus triticoides*).

Table C-3
Coyote Creek
Plant Species Suitable for Revegetation of the Upper Slope of Crossover Areas

Common Name	Scientific Name	Height at Maturity in feet
California Blackberry	*Rubus vitifolius*	(3-6)
Mugwort	*Artemesia douglasiana*	(3-5)
California Wild Rose	*Rosa californica*	(3-10)
Dwarf Coyote Brush	*Baccharis pilularis ssp. pilularis*	(0.7-2)
California Buckwheat	*Eriogonum fasciculatum*	(1-3)
Wild buckwheat	*Eriogonum latifiolium ssp. nudum*	(0.3-1.5)
Annual Lupine	*Lupinus bicolor*	(0.3-1.3)
Silver Lupine	*Lupinus albifrons*	(1-1.5)
California Sagebush	*Artemesia californica*	(3-6)
Wicker Eriogonum	*Eriogonum vimineum*	(0.3-1.6)
Deerweed	*Lotus scoparius*	(1.5-4)
Wild Rye	*Elymus glaucus*	(0.6-1.2)
Sticky Monkey Flower	*Mimulus aurantiacus*	(3-4)

Relocation of the crossover revegetation areas in this manner would restrict plantings to species limited to 3 feet in height above the level of the overflow channel. By planting along the top rather than on a bench at a lower elevation, only low-growing shrubs and herbaceous species can be used.

Because a more diverse and higher cover is desirable for the movement of wildlife species, we recommend the following approach for revegetation of the crossover areas. As recommended in the EIR, topsoil shall be placed in riprap and over the riprap to a depth of 10 inches. This soil shall be hydroseeded immediately for stabilization of the soil layer. This operation may have to be repeated after unusual floods to fill areas where the soil has settled. Once the seeded area has stabilized and vegetation has become established, additional taller vegetation will be planted. Placement of topsoil and hydroseeding has proven successful on other flood control channels reviewed in the area, and it is anticipated that this approach will be successful here unless unusual flood events occur (as they did in Reach 2) shortly after construction.

1.3.3 Setback Areas

In addition to the 20.3 acres of riparian revegetation sites, setback areas totaling 2 acres in Reach 3 were described in the 1984 EIR and are designated for revegetation with riparian habitat. The setback areas are 15- to 20-foot-wide sections adjacent to the existing west bank that will be planted with riparian vegetation. These areas are defined in the Water District 1984 EIR as being located between the upper edge of the overflow channel and the existing riparian vegetation. The setback areas will be determined precisely after the revegetation sites are set out, following levee construction. Setback areas are expected to be located roughly between Stations 642 and 660 on the west bank, except for the areas already planned for revegetation by the Water District (Sites 8 and 9). Riparian vegetation planted in the setback areas will be similar to the vegetation planted in Sites 3 through 7, with an emphasis under-represented native species in the vicinity of the setback areas.

1.4 Soil and Groundwater Testing

Surface soils and groundwater wells were tested at several locations in Reach 1 and Reach 2; high conductivity and high salinity were found. At Site 2 in Reach 2, both soil and groundwater salinity were found to increase upstream, contrary to what would be expected if saline intrusion from San Francisco Bay were the sole cause of the high salinity. Site-specific tests shall be conducted at each of the revegetation areas; species lists will be reviewed once the results of the testing are known.

1.4.1 Soil Tests

Soil tests have been conducted at planting sites in Reaches 1 and 2A. Results of these tests indicated that the application of the soil amendment gypsum was necessary to correct high saline content in Reach 1, but this is not expected to be needed in Reach 3. This will need to be verified before the revegetation design is finalized.

Site-specific soils tests shall be performed before site preparation. Tests will include soil characteristics such as texture, structure, pH, alkalinity, salinity, and organic material content. Tests shall also determine soil nutrient balance and identify plant nutrient deficiencies that will have to be corrected.

Substandard soils will require the contractor to perform remediation to correct any soils problems prior to planting. All soil amendments shall be incorporated into the soil prior to or during the site preparation phase of the final revegetation project.

1.4.2 Groundwater Testing

Ongoing groundwater monitoring results at the pilot revegetation study site and at Site 2 show that the water table level fluctuates, from a low of 105 inches on March 30, 1988, and April 18, 1988, to a high of 53 inches below the surface on May 8, 1987 (HRG, 1991). Groundwater salinity increased upstream along the new wells in Site 2.

The vertical distance between the revegetation sites in Reach 2 and the groundwater levels is much less than the distance to groundwater expected in Reach 3. An average height of 12 to 15 feet separates the revegetation sites in Reach 3 from the elevation of the creek bottom. It is expected that the depth to groundwater in Reach 3 will be at least 12 feet to 15 feet and possibly more. Groundwater elevations thus need to be established before preparing the final design for these Reach 3 revegetation sites. Based on visual observation of the existing vegetation on the outboard levees and the revegetation sites, species observed include box elder, black walnut, elderberries, sycamores, and cottonwoods. Willows are scarce, and some changes to the species mix could be called for if the depth to groundwater is confirmed as greater than 12 to 15 feet.

Groundwater monitoring wells shall be installed at each planting site in Reach 3. Groundwater sampling and analysis shall be conducted at each planting site prior to finalization of planting plans. The results will be incorporated into the final planting design on a site-specific basis; some modifications to species mix may be required. Site-specific groundwater monitoring at the sites in Reach 3 should be conducted for a minimum of 4 years or until the end of the establishment period, starting before the final planting plan is developed (expected to be 1 or 2 years before planting).

1.5 Plant Species

The goals of the revegetation are to (1) reestablish mid- and upper terrace riparian vegetation adjacent to remaining riparian vegetation; (2) reintroduce species that are presently lacking or under-represented, adding to the plant diversity; and (3) replace lost wildlife habitat, such as foraging habitat, nesting sites, cover, and perches (FR/EIS, 44-46). The goal is 100 percent compensation for habitat losses.

Only species native to the project site and nearby areas, presently and historically, will be used. See Table C-4 for preliminary list of species to be used in Reach 3.

1.6 Plant Material Acquisition

1.6.1 Collection Sites

All plant source material (seeds and cuttings) will be custom collected from (in order of preference): (1) areas where vegetation is to be removed for the project; (2) other areas within Reaches 2 and 3; (3) nearby areas along Lower Coyote Creek; and (4) areas along the upper portions of Coyote Creek and its tributaries, within a 5-mile range of the project

Table C-4
Coyote Creek
Preliminary List of Species To Be Planted in Reach 3

Scientific Name	Common Name
TREES	
Acer negundo ssp. californicum	California Box Elder
Aesculus californica	California Buckeye
Alnus rhombifolia	White Alder
Fraxinus latifolia	Oregon Ash
Juglans hindsii	California Black Walnut
Platanus racemosa	Western Sycamore
Populus fremontii	Fremont Cottonwood
Populus trichocarpa	Black Cottonwood
Quercus agrifolia	Coast Live Oak
Quercus lobata	Valley Oak
Salix laevigata	Red Willow
Umbellularia californica	California Bay
SHRUBS	
Artemesia calfornica	California Sage
Baccharis pilularis ssp. consanguinea	Coyote Brush
Baccharis viminea	Mule Fat
Lonicera hispidula var. vacillans	Hairy Honeysuckle
Rhamnus californica	California Coffeeberry
Rosa californica	California Rose
Rubus vitifolius	California Blackberry
Salix hindsiana	Hind's Willow
Salix lasiolepis	Yellow Willow
Sambucus mexicana	Blue Elderberry
Symphoricarpos rivularis	Snowberry
HERBACEOUS SPECIES	
Artemisia douglasiana	Mugwort
Asclepias fascicularis	Narrow-leaved Milkweed
Aster chilensis	Western Aster
Baccharis douglasii	Douglas' Baccharis
Elymus triticoides	Beardless Wild Rye
Glycyrrhiza lepidota var. glutinosa	Wild Licorice
Solidago occidentalis	Western Goldenrod

site. This material may only be supplemented by commercially available native species (not cultivars) where insufficient plant material is available onsite or where collection of plant material is determined to have a negative effect on existing resources. All reasonable efforts will be made to restrict collections to the local area.

1.6.2 Preliminary Propagule Types

The pilot study tested plant species using various propagule types and irrigation techniques in order to determine the percent survival of the propagule types and the best type to use in further plantings. Although the pilot study did not test the effect of a drip irrigation regime on propagule type, the pilot study results for the most part can be applied in choosing the preliminary propagule types to be used.

Table C-5 presents a list of preliminary propagule types and a collection schedule, by species, to be used in Reach 3. Plant material shall be collected as described in Table C-5, allowing sufficient lead time for development of appropriate root mass. Plant material shall be propagated for a period of 8 to 12 months preceding plant installation in the following fall. Plant materials shall be propagated in leach tubes, "dee" pots, or 1-gallon tree pots (deep pots) as described for each species. As shown in Table C-5, some species would be direct seeded or installed as short or long cuttings, not as nursery-grown stock. Some species may be transplanted if sufficient plant material is available within the defined collection area.

The propagule choices are based primarily on sprinkler and flood irrigation results, as they are more representative of a drip irrigation regime than the other two irrigation regimes used in the pilot study (hand watering or no watering). The propagule choices are discussed in greater detail in Attachment A, with survival rates classified by the performance system used in the pilot study.

Based on pilot study results, species planted from leach tubes that had fair or poor success will be planted in slightly larger pots (dee pots) in order to plant stock with a more developed root system to increase survival. All one-gallon stock used in the pilot study will be planted in tree pots, which contain the equivalent of one gallon of soil but are longer and do not restrict root growth. Restricted root growth was determined to be a factor limiting growth and survival in the pilot study, specifically in valley oak stock.

1.6.3 Seed/Cutting Collection and Plant Installation Schedules

Plant material collected as described above in Table C-5 will either be installed immediately (pole cuttings, short cuttings, seeds) or propagated, as described above, in a native plant nursery. Planting of propagated material shall occur between October 1 and December 1.

Pole cuttings and short cuttings shall be harvested while the plants are dormant, typically in December and January. Pole cuttings, and short cuttings to be installed directly, shall be collected and installed within the same day. All cuttings shall be kept covered and moist during storage and transport. Short cuttings will be dipped in rooting hormone immediately prior to installation. Short cuttings collected for propagation in growing containers shall be planted immediately after field collection; cuttings used for nursery propagation can be collected outside the December through January window as long as sufficient lead time remains before out-planting to grow the cutting to the specified size. Mature acorns with no visible damage shall be harvested off the tree in the fall and immersed in water; floating

Table C-5
Coyote Creek
Preliminary List of Propagule or Nursery Stock To Be Planted in Reach 3

Scientific Name	Propagule Type and Nursery Stock Size	Collection Time
TREES		
Acer negundo ssp. californicum	bare root/direct seed or tree pot	fall
Aesculus californica	direct seed/tree pot from seed	fall
Alnus rhombifolia	tree pot from bare root seedlings	fall
Fraxinus latifolia	bare root/tree pot from seed	fall-late fall
Juglans hindsii	direct seed	fall-late fall
Platanus racemosa	tree pot from seed/direct seed	late fall
Populus fremontii	pole cutting	Dec-Jan
Populus trichocarpa	pole cutting	Dec-Jan
Quercus agrifolia	direct seed/tree pot from seed	late fall
Quercus lobata	direct seed/tree pot from seed	late fall
Salix laevigata	short or pole cutting or tree pot	Dec-Jan
Umbellularia californica	dee pot or tree pot from seed	late fall
SHRUBS		
Artemesia calfornica	dee pot or tree pot from seed or transplants	late fall
Baccharis pilularis ssp. consanguinea	dee pot from seed or cutting	fall
Baccharis viminea	tree pot from seed or cutting	late fall
Lonicera hispidula var. vacillans	dee pot or tree pot from seed or cutting	fall
Rhamnus californica	dee pot from seed	fall
Rosa californica	dee pot from seed or cuttings	fall/winter
Rubus vitifolius	dee pot from seed or cuttings/ or transplants	fall/winter
Salix hindsiana	short or pole cutting/or tree pot	fall-winter
Salix lasiolepis	short or pole cutting/or tree pot	fall-winter
Sambucus mexicana	dee pot from seed	fall
Symphoricarpos rivularis	dee pot from cuttings/seed or cuttings	winter or spring
HERBACEOUS SPECIES		
Artemisia douglasiana	dee pot or tree pot from seed	late fall
Asclepias fascicularis	dee pot or tree pot from seed	late fall
Aster chilensis	dee pot from seed	fall
Baccharis douglasii	dee pot or tree pot from seed	fall
Elymus triticoides	transplants, rhizomes, root cuttings or tree pot from seed	fall
Glycyrrhiza lepidota var. glutinosa	dee pot from seed, rhizomes or root cuttings	fall
Solidago occidentalis	dee pot or tree pot from seed	fall

acorns shall be discarded.

1.7 Site Preparation and Schedule

1.7.1 Site Preparation

All planting sites will require site preparation to reduce long-term maintenance costs, such as weed control, and to prevent competition between weed species and young plantings. The revegetation consultant shall be responsible for overseeing all areas of the site preparation and weed control plan implementation.

The weed maintenance component was underestimated in the pilot study design, and the pilot study restoration consultants recommend that action be taken to control weeds before planting woody species. As recommended, site preparation shall begin 1-1/2 years before planting woody species. A general weed control task schedule and timeline based on recommendations of the pilot study is outlined below.

1.7.2 Schedule for Site Preparation and Weed Control

Spring Year 1. The frequency and timing of mowing or discing shall be determined by the revegetation consultant on a site-by-site basis. The site soils shall be mowed or disced to prevent weeds from setting seed and to prepare the ground for seeding a native herbaceous groundcover. If an herbicide such as Rodeo is used for control of rhizomatous species, only spot spraying shall be used. The maintenance procedures for noxious weed eradication shall extend at least through the project establishment period; the need for further weed control will be evaluated at the end of the establishment period.

To minimize the weed control problem presented by the nonnative invasive species that are likely to establish in the overflow channel and in the revegetation sites, seeding of these areas with native perennials and annual herbaceous species is recommended. It is anticipated that seeding the entire overflow channel and revegetation sites would cost under $50,000. It is anticipated that this cost would be recovered in the reduced cost for maintenance and would also fill the requirements of the environmental commitments, which call for erosion control measures in any stripped areas.

Summer to Fall Year 1. The ground shall be prepared for the first seeding of herbaceous native groundcover, composed mainly of perennial and annual grasses, in late summer. Ground preparation shall be accomplished by discing or deep ripping. All vegetative remains should be mixed thoroughly into the soil, and soil amendments should be added if determined necessary by soils analysis. Refer to Table C-6 for a list of species that are acceptable for use as a groundcover.

The native groundcover mixture shall be incorporated into the prepared ground. The application of seed in pounds per acre shall be at a high density to achieve a high initial germination rate. Fertilizers shall be applied only if the site-specific soil analysis shows a lack of essential nutrients, since the nitrogen component of fertilizers stimulates the growth

Table C-6
Coyote Creek
Native Grass and Herbaceous Species Suitable for Revegetation in the Crossover Area

Scientific Name	Common Name	Species Characteristics and Site Suitability
Bromus carinatus	California brome	Annual or biennial native bunchgrass. Seeds supply high wildlife value. Somewhat drought tolerant.
Elymus glaucus	Blue Wildrye	Perennial native bunchgrass. Drought tolerant.
Festuca megalura	Annual Fescue	Annual native grass. Drought tolerant.
Elymus triticoides	Creeping Wild Rye	Perennial native grass. Heat tolerant. Can form dense stands from rhizomes, very good for erosion control.
Hordeum brachyantherum	Meadow Barley	Perennial native grass. Will establish on disturbed sites, but will not persist in dry sites. Useful as nurse crop for other perennial species.
Stipa pulchra	Purple Needle Grass	Perennial bunchgrass. Drought and heat tolerant. Suitable for disturbed and thin soils but is slow to establish.
Eschscholzia californica	California Poppy	Annual to perennial native. Grown from seed broadcast in late-summer to early winter.
Lupinus bicolor	Dove Lupine	Annual native. Can be grown from broadcast seed.
Achillea millefolium	White Yarrow	Perennial native. Can be grown from seed broadcast in fall.

Sources:

Munz, Phillip A. A California Flora with Supplement. University of California Press, Berkeley.

Amme, David. Conservation and Restoration with Native Perennial Grasses. Our California Environment. Spring, 1991.

of weeds (HRG, 1991). The pilot study recommends the use of a cultipacker pulled behind a tractor to pack the seeds down after they are mixed into the soil.

The revegetation consultant shall be responsible for choosing an acceptable seed mixture off the list of species included in Table C-6 or for choosing an alternative native seed mixture with prior authorization from the contracting officer. The revegetation consultant shall also be responsible for overseeing hand methods of seed mixing and compaction methods. The revegetation contractor shall be responsible for performing seed viability tests on samples from seed lots to be used in the revegetation effort to ensure acceptable germination rates. This shall be done with sufficient lead time in which to order replacement seed from another source if the germination tests fall below an acceptable level. Seed may require treatment with an anti-fungal agent, if this is determined necessary by the revegetation contractor. The perennial native grass seeds will be allowed to germinate by fall and winter rains or by a supplemental watering method, such as a moveable sprinkler system, which can be installed if rainfall is low. The purpose of the groundcover is to establish a native herbaceous component and seed source that will aid in outcompeting the non-native weed source on the site, decreasing the need for intensive weed maintenance during the monitoring period of the restoration plan.

Winter Year 1 to Early Summer Year 2. The seeded perennial native grass groundcover must be mowed periodically during this timeframe to prevent the setting of the weed seeds that also germinated with the perennial grasses. The revegetation contractor shall be responsible for assessing the timing of all weed species life cycles and mowing all sites before seed is set. The revegetation contractor shall be responsible for determining if the spot application of herbicides is necessary to eliminate rhizomatous species at this time.

Late Summer Year 2. Before planting woody species, a second application of native species seed is recommended, to be determined by the revegetation consultant based on the success rate of the first application. Seeds shall be broadcast seeded over the site rather than mixed into the soil, which would disturb already growing natives. This mix may contain more of an annual herbaceous component than represented in the first herbaceous groundcover mixture. It shall be the responsibility of the revegetation contractor to determine an appropriate mixture on a site-specific basis with prior approval of the revegetation consultant.

1.8 Planting Techniques

1.8.1 Collection, Purchase, and Storage Techniques for Plant Materials

Implementation of the revegetation plan shall be carried out by one or more contractors familiar with native plant restoration projects. The contractors must be familiar with: methodologies, such as onsite plant material collection and propagation techniques, that afford the site the protection of genetic integrity; correct planting techniques, including site preparation and browse protection; irrigation system installation and maintenance; and appropriate methods of noxious weed control, as outlined in the planting techniques below.

1.8.2 Species Collection, Storage, and Contract Growing

The revegetation contractor shall be responsible for ensuring that all specifications concerning site collection are met. This will entail choosing high quality onsite collection source plants, regular inspections during the onsite collection process, and inspection of the nursery in which the collected species will be stored as seed or grown in containers such as leach tubes and dee pots. In addition to ensuring the quality of contract-grown propagules, the revegetation contractor shall be responsible for ensuring that no planting stock accepted is in poor condition (e.g., rootbound or under extreme water stress).

Sufficient lead time must be allowed before the planting of woody species to allow for proper site preparation and onsite collection, as described previously. Site preparation for this project will start 1-1/2 years before the planting of woody species. All onsite species collection for propagated material must start the year before planting.

1.8.3 *Planting Densities*

Planting densities recommended in earlier documents included planting trees on 10-foot centers (435/acre) in areas 2 acres or larger or on 8-foot centers (675/acre) in smaller areas. This would mean planting 20.3 acres with 8,830 trees and planting the 2 acres of setback area with 1,350 trees. Certain fast-growing species, however, such as the cottonwoods, will produce a closed canopy, dense, uniform growth that will crowd out other species and provide less wildlife diversity. These species are recommended at lesser overall densities than those originally proposed, preferably on 12-foot to 15-foot centers.

Shrubs were to be planted at densities of 665/acre, with herbaceous species and shrubs at 970 plants/acre. Shrubs will be grouped and not evenly distributed.

A lower density of shrubs and trees is recommended, to more closely resemble a natural developing riparian system. Recommended numbers of each species within the zones of each site are included in Tables C-7 through C-11.

1.8.4 *Planting Design*

The pilot site was broken into two planting zones according to increased distance from Coyote Creek, with densities of species calculated for each zone. Zone 1 extends from Coyote Creek to 150 feet upslope and represents midlevel floodplain species. Planting Zone 2 extends from the limit of Zone 1, 150 feet upslope of Coyote Creek, and encompasses the remainder of the site. This zone represents upper level floodplain species. The revegetation sites along Reach 3 are expected to have a significantly greater distance to groundwater than the revegetation sites in Reach 2. Without conducting groundwater testing to support the division of the Reach 3 revegetation area into planting zones, as was done in Reach 2, the distance from surface water in the creek to the elevation of the revegetation sites was used as a guide in developing a preliminary planting mixture for each revegetation site. Using this distance, revegetation sites break into two zones: Zone 1 is the area with 15 feet or less difference between the estimated groundwater elevation and the approximate elevation of the revegetation area; Zone 2 is the area with 15 feet or more difference. These planting mixtures are preliminary, and groundwater elevation testing must be conducted before finalization of the planting mix design.

The preliminary planting mixture for each zone at each site along Reach 3 is listed in Tables C-7 through C-11.

1.8.5 *Installation Techniques for the Suggested Propagule Types*

The planting techniques recommended for the propagule types are listed below. All seeds shall be direct seeded into protective collars, with sterile soil used as a medium in the top 3 inches of soil. The slant end of short cuttings to be planted directly shall be dipped in rooting hormone before being placed into augured holes. A minimum of three nodes on each cutting shall be above and below the ground line to ensure rooting success. Pole cuttings shall be 6 to 10 feet long, of no greater than 1 inch in diameter, and shall be placed in augured holes, 6 feet deep and 8 inches in diameter and backfilled with soil,

Table C-7

Preliminary Revegetation Site 3 Species and Density Plan

		Zone 1				Zone 2		
Trees	**Spacing (ft)**	**Percent Species**	**Total acres Zone 1**	**Total trees Zone 1**	**Percent Species**	**Total acres Zone 2**	**Total zone 2 Trees**	**Total trees Site 3**
Acer negundo ssp. californicum	14-15'	0.1	1.7	34	0	0.3	0	34
Aesculus californica	14-15'	0.05	1.7	17	0.1	0.3	6	23
Alnus rhombifolia	14-15'	0.02	1.7	7	0	0.3	0	7
Fraxinus latifolia	14-15'	0.02	1.7	7	0	0.3	0	7
Juglans hindsii	14-15'	0.05	1.7	17	0.1	0.3	6	23
Platanus racemosa	14-15'	0.04	1.7	13	0.05	0.3	3	16
Populus fremontii	14-15'	0.2	1.7	67	0.14	0.3	8	76
Populus trichocarpa	14-15'	0.01	1.7	3	0.01	0.3	1	4
Quercus agrifolia	14-15'	0	1.7	0	0.2	0.3	12	12
Quercus lobata	14-15'	0.2	1.7	67	0.2	0.3	12	79
Salix laevigata	14-15'	0.1	1.7	34	0.1	0.3	6	40
Sambucus mexicana	14-15'	0.2	1.7	67	0.1	0.3	6	73
Umbellularia californica	14-15'	0.01	1.7	3	0	0.3	0	3
		1.00		337	1.00		59	396
Shrubs and Herbaceous Species				**Total shrubs and herbs**			**Total shrubs and herbs**	**Total shrubs and herbs**
Artemesia douglasii	8-10'	0.1	1.7	92	0.05	0.3	8	100
Artemesia californica	8-10'	0.02	1.7	18	0.03	0.3	5	23
Asclepias fascicularis	8-10'	0.02	1.7	18	0.04	0.3	6	25
Aster chilensis	8-10'	0.02	1.7	18	0.04	0.3	6	25
Baccharis douglasii	8-10'	0.02	1.7	18	0.02	0.3	3	22
Baccharis pilularis ssp. consanguinea	8-10'	0.02	1.7	18	0.1	0.3	16	35
Baccharis viminea	8-10'	0.02	1.7	18	0	0.3	0	18
Chrysopsis oregona var. rudis	8-10'	0.02	1.7	18	0.05	0.3	8	26
Elymus triticoides	8-10'	0.15	1.7	138	0.15	0.3	24	162
Glycyrrhiza lepidota var. glutinosa	8-10'	0.02	1.7	18	0.05	0.3	8	26
Rhamnus californica	8-10'	0.01	1.7	9	0.01	0.3	2	11
Rosa californica	8-10'	0.15	1.7	138	0.15	0.3	24	162
Rubus vitifolius	8-10'	0.15	1.7	138	0.15	0.3	24	162
Salix hindsiana	8-10'	0.1	1.7	92	0.03	0.3	5	97
Salix lasiolepis	8-10'	0.1	1.7	92	0.03	0.3	5	97
Solidago occidentalis	8-10'	0.03	1.7	28	0.05	0.3	8	36
Symphoricarpos rivularis	8-10'	0.05	1.7	46	0.05	0.3	8	54
		1.00		918	1.00		162	1,081
Total Plants in Site 3 Preliminary Revegetation Plan				1,255			221	1,477
Note: Zone 1 and 2 calculations are based on estimated depth to groundwater								

Table C-8

Preliminary Revegetation Site 4 Species and Density Plan

Trees	Spacing (ft)	Zone 1 Percent Species	Total acres Zone 1	Total trees Zone 1	Percent Species	Zone 2 Total acres Zone 2	Total zone 2 Trees	Total trees Site 3
Acer negundo ssp. californicum	14-15'	0.1	2.4	48	0	0.1	0	48
Aesculus californica	14-15'	0.05	2.4	24	0.1	0.1	2	26
Alnus rhombifolia	14-15'	0.02	2.4	10	0	0.1	0	10
Fraxinus latifolia	14-15'	0.02	2.4	10	0	0.1	0	10
Juglans hindsii	14-15'	0.05	2.4	24	0.1	0.1	2	26
Platanus racemosa	14-15'	0.04	2.4	19	0.05	0.1	1	20
Populus fremontii	14-15'	0.2	2.4	95	0.14	0.1	3	98
Populus trichocarpa	14-15'	0.01	2.4	5	0.01	0.1	0	5
Quercus agrifolia	14-15'	0	2.4	0	0.2	0.1	4	4
Quercus lobata	14-15'	0.2	2.4	95	0.2	0.1	4	99
Salix laevigata	14-15'	0.1	2.4	48	0.1	0.1	2	50
Sambucus mexicana	14-15'	0.2	2.4	95	0.1	0.1	2	97
Umbellularia californica	14-15'	0.01	2.4	5	0	0.1	0	5
		1.00		475	1.00		20	495
Shrubs and Herbaceous Species				**Total shrubs and herbs**			**Total shrubs and herbs**	**Total shrubs and herbs**
Artemesia douglasii	8-10'	0.1	2.4	130	0.05	0.1	3	132
Artemesia californica	8-10'	0.02	2.4	26	0.03	0.1	2	28
Asclepias fascicularis	8-10'	0.02	2.4	26	0.04	0.1	2	28
Aster chilensis	8-10'	0.02	2.4	26	0.04	0.1	2	28
Baccharis douglasii	8-10'	0.02	2.4	26	0.02	0.1	1	27
Baccharis pilularis ssp. consanguinea	8-10'	0.02	2.4	26	0.1	0.1	5	31
Baccharis viminea	8-10'	0.02	2.4	26	0	0.1	0	26
Chrysopsis oregona var. rudis	8-10'	0.02	2.4	26	0.05	0.1	3	29
Elymus triticoides	8-10'	0.15	2.4	194	0.15	0.1	8	203
Glycyrrhiza lepidota var. glutinosa	8-10'	0.02	2.4	26	0.05	0.1	3	29
Rhamnus californica	8-10'	0.01	2.4	13	0.01	0.1	1	14
Rosa californica	8-10'	0.15	2.4	194	0.15	0.1	8	203
Rubus vitifolius	8-10'	0.15	2.4	194	0.15	0.1	8	203
Salix hindsiana	8-10'	0.1	2.4	130	0.03	0.1	2	131
Salix lasiolepis	8-10'	0.1	2.4	130	0.03	0.1	2	131
Solidago occidentalis	8-10'	0.03	2.4	39	0.05	0.1	3	42
Symphoricarpos rivularis	8-10'	0.05	2.4	65	0.05	0.1	3	68
		1.00		1,296	1.00		54	1,351
Total Plants in Site 3 Preliminary Revegetation Plan				1,771			74	1,846
Note: Zone 1 and 2 calculations are based on estimated depth to groundwater								

Table C-9

Preliminary Revegetation Site 5 Species and Density Plan

		Zone 1				Zone 2		
Trees	Spacing (ft)	Percent Species	Total acres Zone 1	Total trees Zone 1	Percent Species	Total acres Zone 2	Total zone 2 Trees	Total trees Site 3
Acer negundo ssp. californicum	14-15'	0.1	3.8	75	0	0.4	0	75
Aesculus californica	14-15'	0.05	3.8	38	0.1	0.4	8	46
Alnus rhombifolia	14-15'	0.02	3.8	15	0	0.4	0	15
Fraxinus latifolia	14-15'	0.02	3.8	15	0	0.4	0	15
Juglans hindsii	14-15'	0.05	3.8	38	0.1	0.4	8	46
Platanus racemosa	14-15'	0.04	3.8	30	0.05	0.4	4	34
Populus fremontii	14-15'	0.2	3.8	150	0.14	0.4	11	162
Populus trichocarpa	14-15'	0.01	3.8	8	0.01	0.4	1	8
Quercus agrifolia	14-15'	0	3.8	0	0.2	0.4	16	16
Quercus lobata	14-15'	0.2	3.8	150	0.2	0.4	16	166
Salix laevigata	14-15'	0.1	3.8	75	0.1	0.4	8	83
Sambucus mexicana	14-15'	0.2	3.8	150	0.1	0.4	8	158
Umbellularia californica	14-15'	0.01	3.8	8	0	0.4	0	8
		1.00		752	1.00		79	832
Shrubs and Herbaceous				Total shrubs			Total shrubs	Total shrubs
Species				and herbs			and herbs	and herbs
Artemesia douglasii	8-10'	0.1	3.8	205	0.05	0.4	11	216
Artemesia californica	8-10'	0.02	3.8	41	0.03	0.4	6	48
Asclepias fascicularis	8-10'	0.02	3.8	41	0.04	0.4	9	50
Aster chilensis	8-10'	0.02	3.8	41	0.04	0.4	9	50
Baccharis douglasii	8-10'	0.02	3.8	41	0.02	0.4	4	45
Baccharis pilularis ssp. consanguinea	8-10'	0.02	3.8	41	0.1	0.4	22	63
Baccharis viminea	8-10'	0.02	3.8	41	0	0.4	0	41
Chrysopsis oregona var. rudis	8-10'	0.02	3.8	41	0.05	0.4	11	52
Elymus triticoides	8-10'	0.15	3.8	308	0.15	0.4	32	340
Glycyrrhiza lepidota var. glutinosa	8-10'	0.02	3.8	41	0.05	0.4	11	52
Rhamnus californica	8-10'	0.01	3.8	21	0.01	0.4	2	23
Rosa californica	8-10'	0.15	3.8	308	0.15	0.4	32	340
Rubus vitifolius	8-10'	0.15	3.8	308	0.15	0.4	32	340
Salix hindsiana	8-10'	0.1	3.8	205	0.03	0.4	6	212
Salix lasiolepis	8-10'	0.1	3.8	205	0.03	0.4	6	212
Solidago occidentalis	8-10'	0.03	3.8	62	0.05	0.4	11	72
Symphoricarpos rivularis	8-10'	0.05	3.8	103	0.05	0.4	11	113
		1.00		2,052	1.00		216	2,269
Total Plants in Site 3 Preliminary Revegetation Plan				2,804			295	3,101

Note: Zone 1 and 2 calculations are based on estimated depth to groundwater

Table C-10

Preliminary Revegetation Site 6 Species and Density Plan

		Zone 1				Zone 2		
:		Percent	Total acres	Total trees	Percent	Total acres	Total zone 2	Total trees
Trees	Spacing (ft)	Species	Zone 1	Zone 1	Species	Zone 2	Trees	Site 3
Acer negundo ssp. californicum	14-15'	0.1	7.7	152	0	0.4	0	152
Aesculus californica	14-15'	0.05	7.7	76	0.1	0.4	8	84
Alnus rhombifolia	14-15'	0.02	7.7	30	0	0.4	0	30
Fraxinus latifolia	14-15'	0.02	7.7	30	0	0.4	0	30
Juglans hindsii	14-15'	0.05	7.7	76	0.1	0.4	8	84
Platanus racemosa	14-15'	0.04	7.7	61	0.05	0.4	4	65
Populus fremontii	14-15'	0.2	7.7	305	0.14	0.4	11	316
Populus trichocarpa	14-15'	0.01	7.7	15	0.01	0.4	1	16
Quercus agrifolia	14-15'	0	7.7	0	0.2	0.4	16	16
Quercus lobata	14-15'	0.2	7.7	305	0.2	0.4	16	321
Salix laevigata	14-15'	0.1	7.7	152	0.1	0.4	8	160
Sambucus mexicana	14-15'	0.2	7.7	305	0.1	0.4	8	313
Umbellularia californica	14-15'	0.01	7.7	15	0	0.4	0	15
		1.00		1,525	1.00		79	1,604
Shrubs and Herbaceous				Total shrubs			Total shrubs	Total shrubs
Species				and herbs			and herbs	and herbs
Artemesia douglasii	8-10'	0.1	7.7	416	0.05	0.4	11	427
Artemesia californica	8-10'	0.02	7.7	83	0.03	0.4	6	90
Asclepias fascicularis	8-10'	0.02	7.7	83	0.04	0.4	9	92
Aster chilensis	8-10'	0.02	7.7	83	0.04	0.4	9	92
Baccharis douglasii	8-10'	0.02	7.7	83	0.02	0.4	4	87
Baccharis pilularis ssp. consanguinea	8-10'	0.02	7.7	83	0.1	0.4	22	105
Baccharis viminea	8-10'	0.02	7.7	83	0	0.4	0	83
Chrysopsis oregona var. rudis	8-10'	0.02	7.7	83	0.05	0.4	11	94
Elymus triticoides	8-10'	0.15	7.7	624	0.15	0.4	32	656
Glycyrrhiza lepidota var. glutinosa	8-10'	0.02	7.7	83	0.05	0.4	11	94
Rhamnus californica	8-10'	0.01	7.7	42	0.01	0.4	2	44
Rosa californica	8-10'	0.15	7.7	624	0.15	0.4	32	656
Rubus vitifolius	8-10'	0.15	7.7	624	0.15	0.4	32	656
Salix hindsiana	8-10'	0.1	7.7	416	0.03	0.4	6	422
Salix lasiolepis	8-10'	0.1	7.7	416	0.03	0.4	6	422
Solidago occidentalis	8-10'	0.03	7.7	125	0.05	0.4	11	136
Symphoricarpos rivularis	8-10'	0.05	7.7	208	0.05	0.4	11	219
		1.00		4,158	1.00		216	4,375
Total Plants in Site 3 Preliminary Revegetation Plan				5,683			295	5,979
Note: Zone 1 and 2 calculations are based on estimated depth to groundwater								

Table C-11

Preliminary Revegetation Site7 Species and Density Plan

		Zone 1				Zone 2		
		Percent	Total acres	Total trees	Percent	Total acres	Total zone 2	Total trees
Trees	**Spacing (ft)**	**Species**	**Zone 1**	**Zone 1**	**Species**	**Zone 2**	**Trees**	**Site 3**
Acer negundo ssp. californicum	14-15'	0.1	1.75	35	0	1.75	0	35
Aesculus californica	14-15'	0.05	1.75	17	0.1	1.75	35	52
Alnus rhombifolia	14-15'	0.02	1.75	7	0	1.75	0	7
Fraxinus latifolia	14-15'	0.02	1.75	7	0	1.75	0	7
Juglans hindsii	14-15'	0.05	1.75	17	0.1	1.75	35	52
Platanus racemosa	14-15'	0.04	1.75	14	0.05	1.75	17	31
Populus fremontii	14-15'	0.2	1.75	69	0.14	1.75	49	118
Populus trichocarpa	14-15'	0.01	1.75	3	0.01	1.75	3	7
Quercus agrifolia	14-15'	0	1.75	0	0.2	1.75	69	69
Quercus lobata	14-15'	0.2	1.75	69	0.2	1.75	69	139
Salix laevigata	14-15'	0.1	1.75	35	0.1	1.75	35	69
Sambucus mexicana	14-15'	0.2	1.75	69	0.1	1.75	35	104
Umbellularia californica	14-15'	0.01	1.75	3	0	1.75	0	3
		1.00		347	1.00		347	693
Shrubs and Herbaceous				**Total shrubs**			**Total shrubs**	**Total shrubs**
Species				**and herbs**			**and herbs**	**and herbs**
Artemesia douglasii	8-10'	0.1	1.75	95	0.05	1.75	47	142
Artemesia californica	8-10'	0.02	1.75	19	0.03	1.75	28	47
Asclepias fascicularis	8-10'	0.02	1.75	19	0.04	1.75	38	57
Aster chilensis	8-10'	0.02	1.75	19	0.04	1.75	38	57
Baccharis douglasii	8-10'	0.02	1.75	19	0.02	1.75	19	38
Baccharis pilularis ssp. consanguinea	8-10'	0.02	1.75	19	0.1	1.75	95	113
Baccharis viminea	8-10'	0.02	1.75	19	0	1.75	0	19
Chrysopsis oregona var. rudis	8-10'	0.02	1.75	19	0.05	1.75	47	66
Elymus triticoides	8-10'	0.15	1.75	142	0.15	1.75	142	284
Glycyrrhiza lepidota var. glutinosa	8-10'	0.02	1.75	19	0.05	1.75	47	66
Rhamnus californica	8-10'	0.01	1.75	9	0.01	1.75	9	19
Rosa californica	8-10'	0.15	1.75	142	0.15	1.75	142	284
Rubus vitifolius	8-10'	0.15	1.75	142	0.15	1.75	142	284
Salix hindsiana	8-10'	0.1	1.75	95	0.03	1.75	28	123
Salix lasiolepis	8-10'	0.1	1.75	95	0.03	1.75	28	123
Solidago occidentalis	8-10'	0.03	1.75	28	0.05	1.75	47	76
Symphoricarpos rivularis	8-10'	0.05	1.75	47	0.05	1.75	47	95
		1.00		945	1.00		945	1,891
Total Plants in Site 3 Preliminary Revegetation Plan				1,292			1,292	2,584
Note: Zone 1 and 2 calculations are based on estimated depth to groundwater								

taking care to tamp the soil to remove air pockets. Container plants (dee pots, tubelings, tree pots) shall be planted directly into native soil as shown on Figures C-4 through C-10. Transplanted material shall be planted the same day it is collected. Plants must be kept moist and cool during storage and transportation and protected from direct exposure to wind and sunlight while out of the ground.

All planted species must be protected from weed invasion by a weed mat or 3 inches of organic mulch. If a weed mat is used, it shall be anchored to the ground by staples. The fabric is to be a 3- by 3-foot piece of woven polypropylene, at 3 ounces per square yard and is to be anchored with six (8-inch) wire staples.

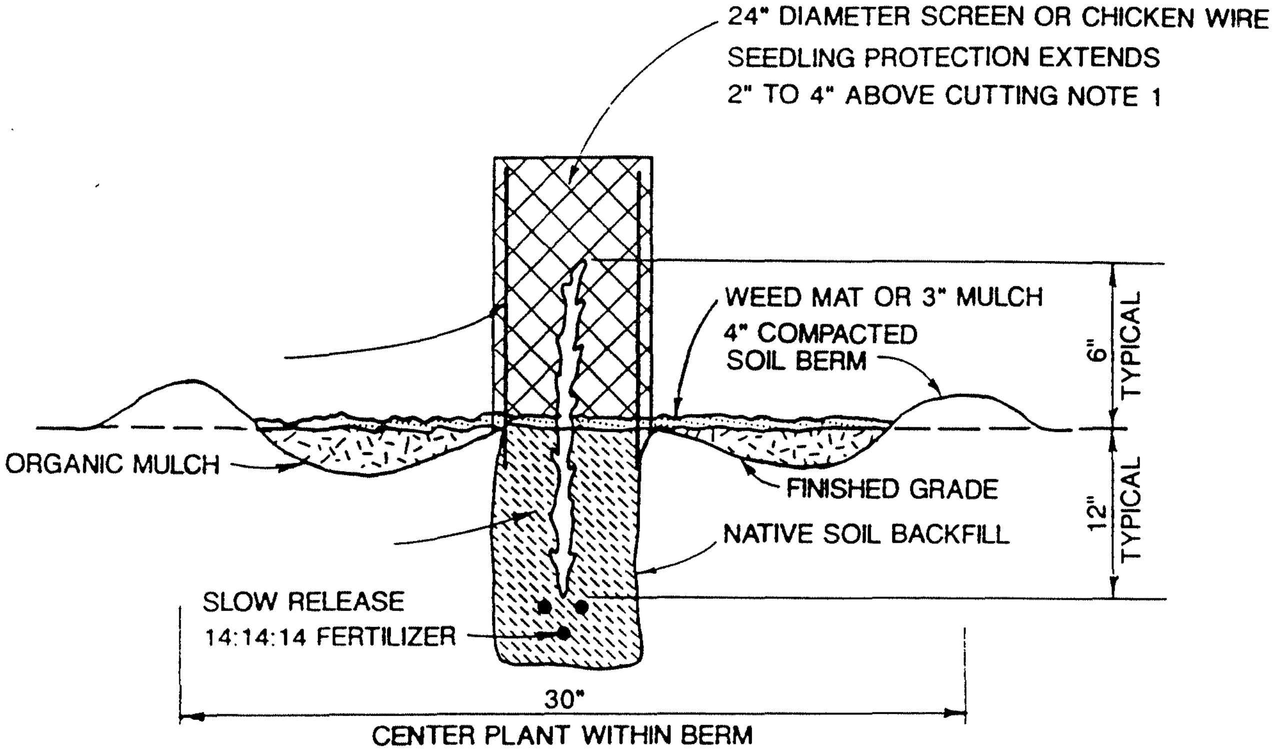
Fertilizer, such as slow release 14:14:14 Osmocote, shall be included in the planting hole and shall not be in direct contact with the roots. At the time of installation, container stock shall be well-watered before removal from the containers. All plants shall be watered thoroughly upon installation. Plants stored temporarily onsite during planting shall be protected from excessive sun and heat. Plant protection collars and screens shall be installed as described in Section 1.8.7.

1.8.6 Weed Control

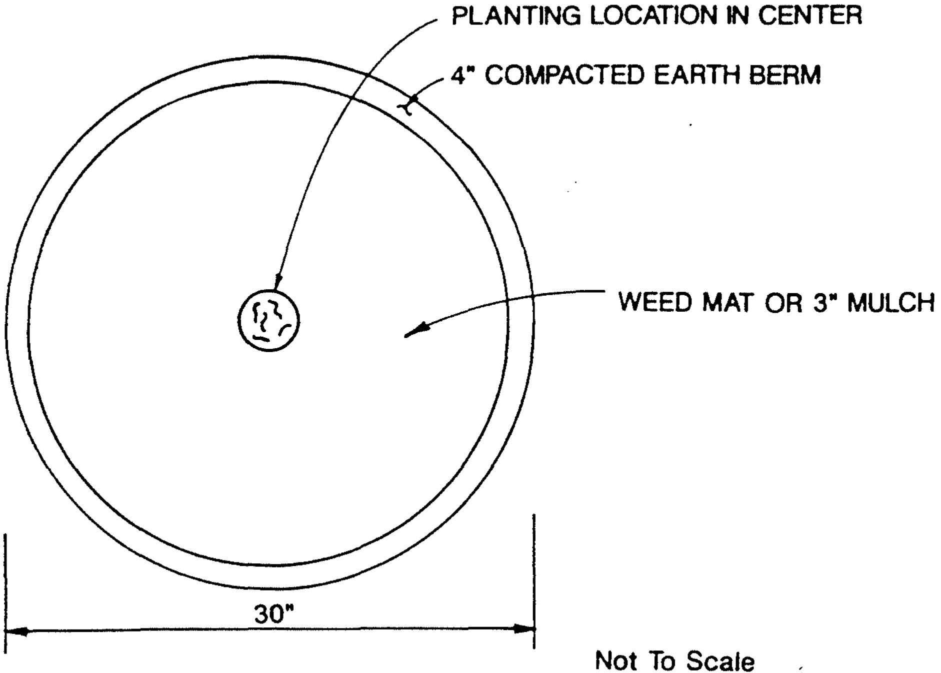
For purposes of the final planting design and establishment program, "noxious weeds" are those that are injurious to agriculture, as defined by state and local agencies, and those that interfere with the growth, vigor, and establishment of native species. A number of noxious plant species occur on the site, and the potential exists for several more species to become established as the restored communities mature. Table C-12 lists potential and existing noxious plants for the site. Additional information on weed species is being developed for Reach 2 for the Water District; it should be used as a reference also. Noxious plants shall be eradicated as soon as possible to remove the seed source and shall be monitored for a minimum of the length of the establishment period.

Removal of introduced grassland species, which are included in the list of noxious plants (Table C-12), shall be accomplished during the site preparation phase of the plan; it is expected, however, that permanent removal of the introduced grassland species may not be feasible. A minimum of three mowing cycles shall be used to minimize seed set of the introduced species, and two heavy applications of perennial native grasses will be used to establish a native herbaceous groundcover designed to outcompete the introduced species (see Site Preparation). Results of the monitoring during the establishment period will be used to determine if further mowings of the herbaceous groundcover are necessary. Hardwoods are extremely sensitive to grass competition during the establishment phase. If the weed mat is not effective in controlling grass around the seedlings, spot application of herbicide around the seed may be used to control the competition during the first 2 years.

The revegetation consultant shall be responsible for meeting the noxious weed specifications and determining the need for further weed control during the monitoring phase of the revegetation plan.



SECTION



PLAN VIEW

Not To Scale

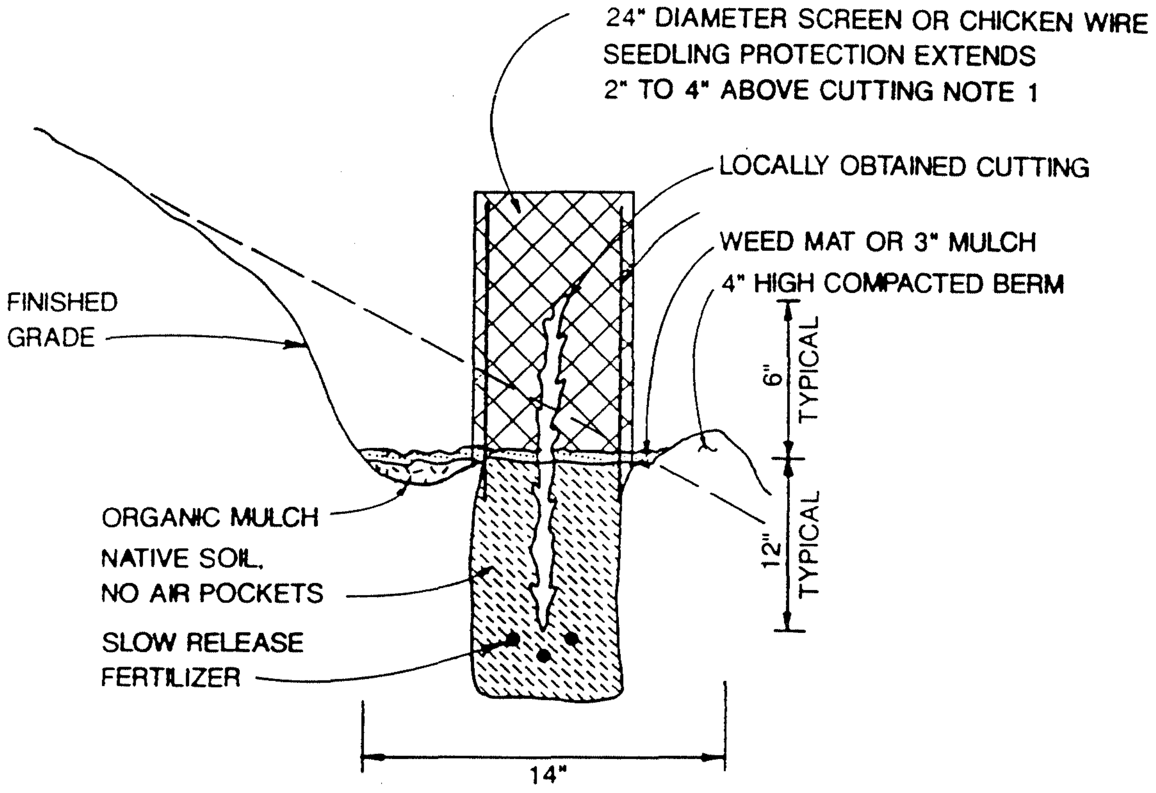
NOTE 1: SEE FIGURE D-9 & D-10
PLANT PROTECTION DETAIL A & B.

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

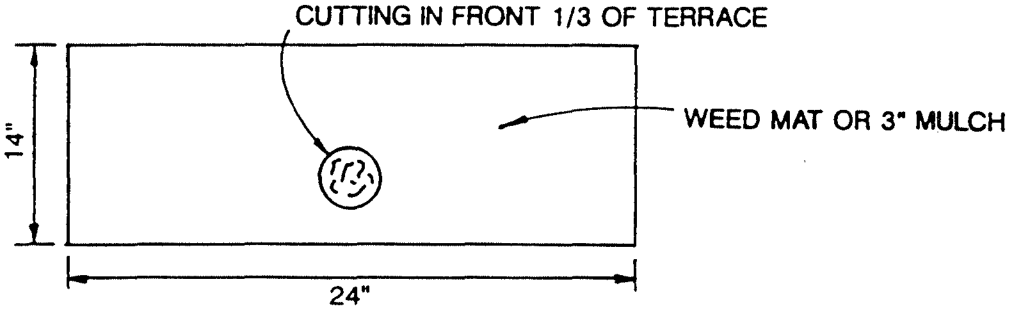
FIGURE C-4
CUTTING ON LEVEL GROUND

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993



SECTION



PLAN VIEW

Not To Scale

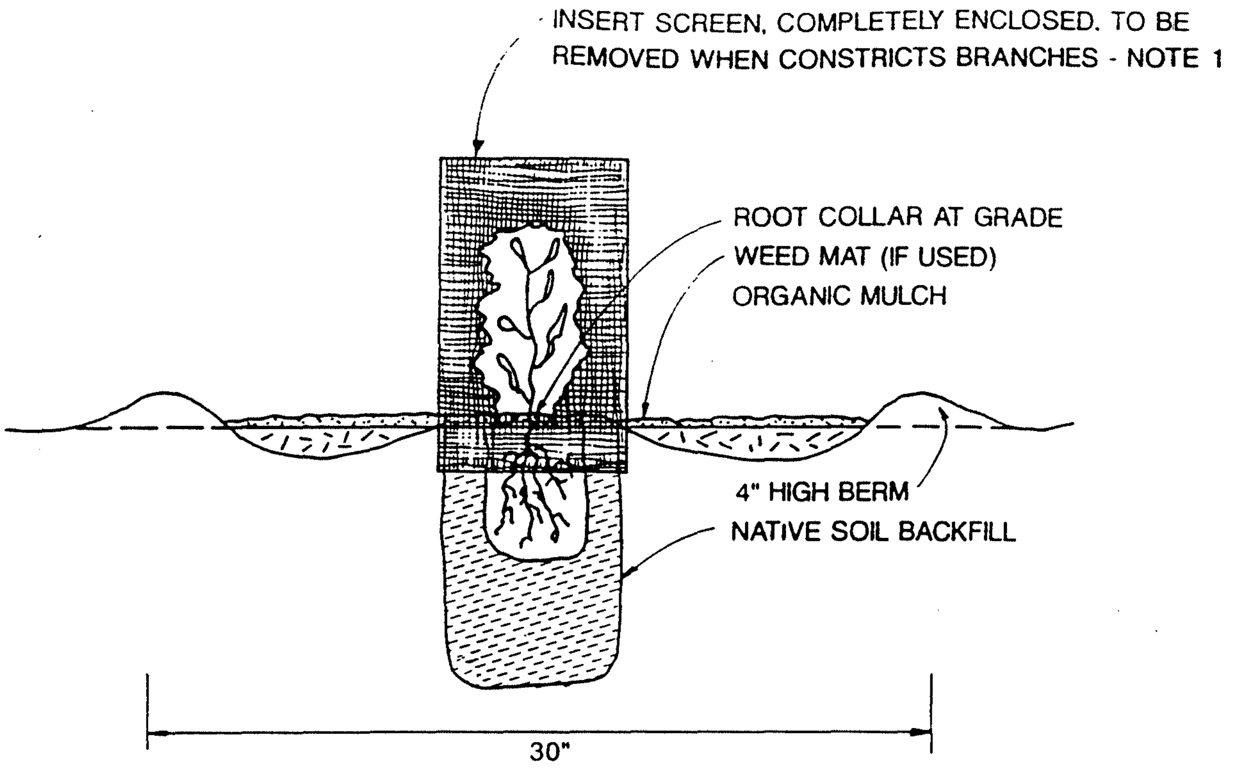
NOTE 1: (NOTE TO GRAPHICS: COPY FROM FIGURE D-1)

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

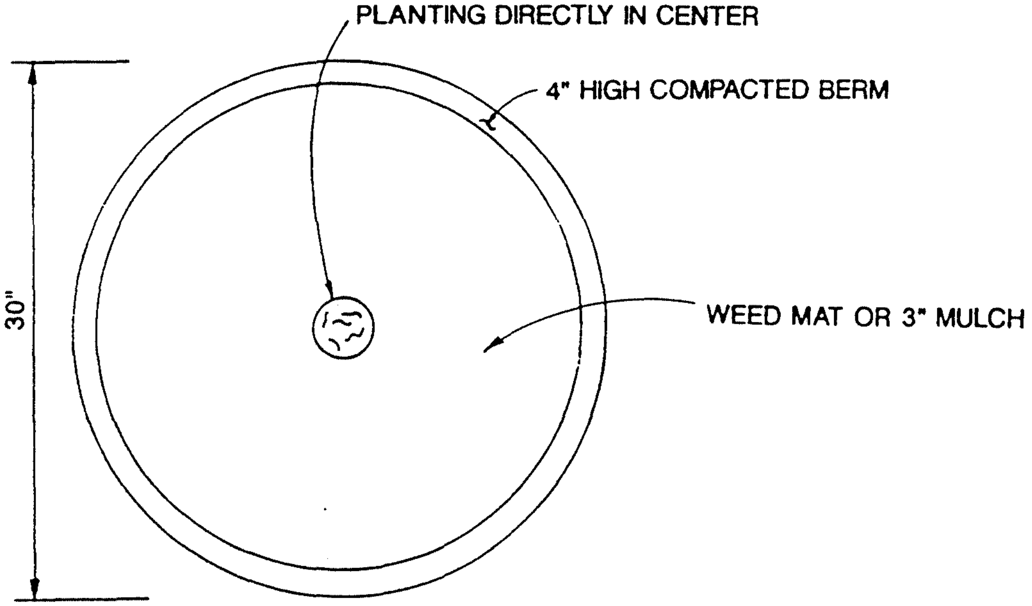
FIGURE C-5
CUTTING ON SLOPE

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993



SECTION



PLAN VIEW

Not To Scale

NOTE 1: (COPY FROM D-1)

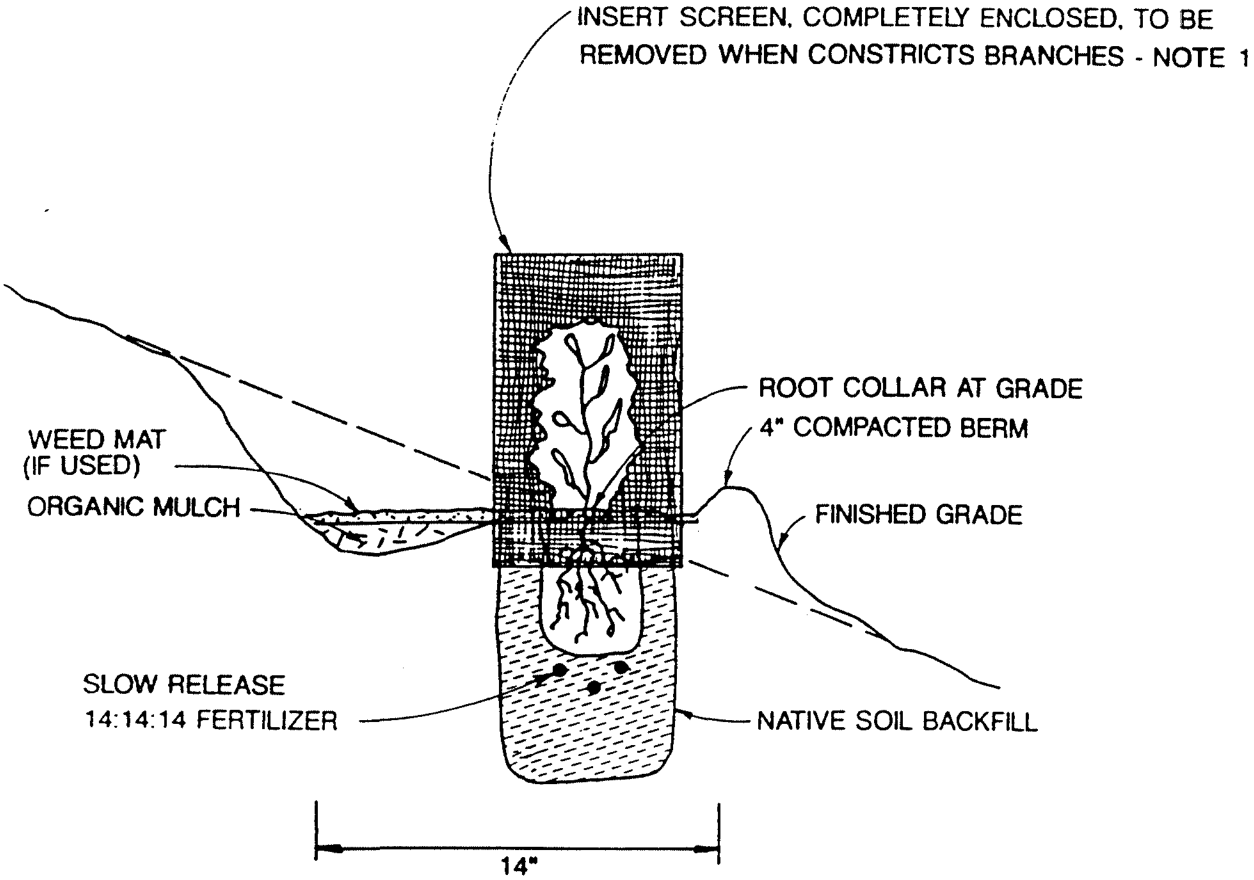
COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-6

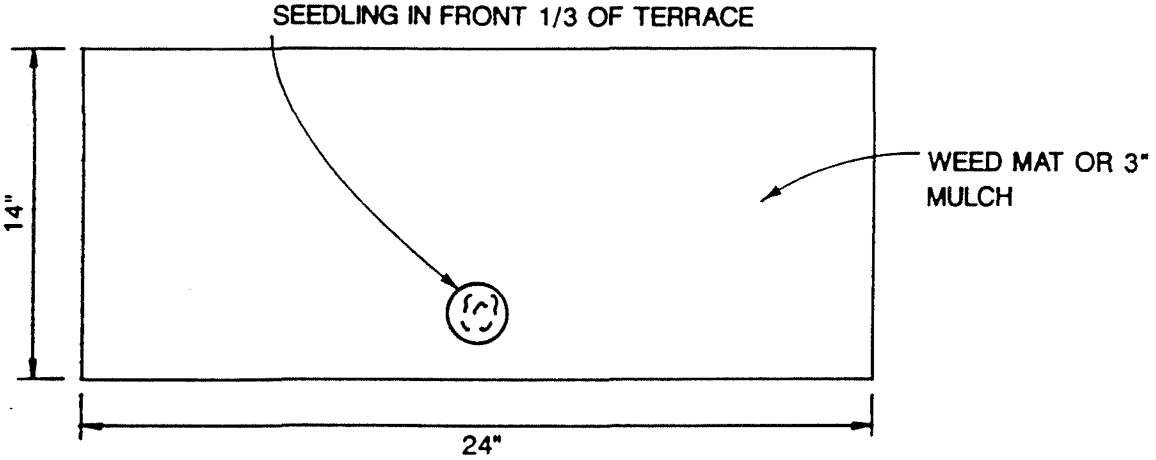
CONTAINER PLANT ON LEVEL GROUND

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993


INSERT SCREEN, COMPLETELY ENCLOSED, TO BE REMOVED WHEN CONSTRICTS BRANCHES - NOTE 1
ROOT COLLAR AT GRADE
4" COMPACTED BERM
WEED MAT (IF USED)
ORGANIC MULCH
FINISHED GRADE
SLOW RELEASE 14:14:14 FERTILIZER
NATIVE SOIL BACKFILL
14"

SECTION



PLAN VIEW

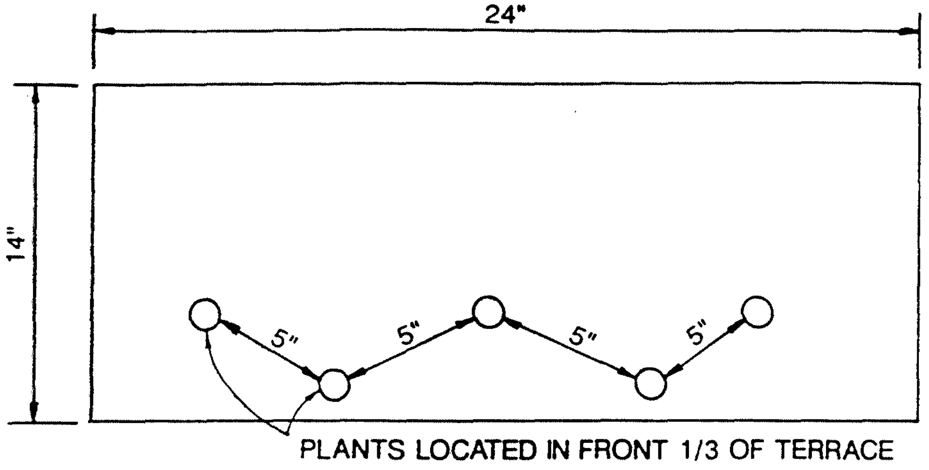
Not To Scale

NOTE 1: (COPY FROM D-1)

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
FIGURE C-7
CONTAINER PLANT ON SLOPE

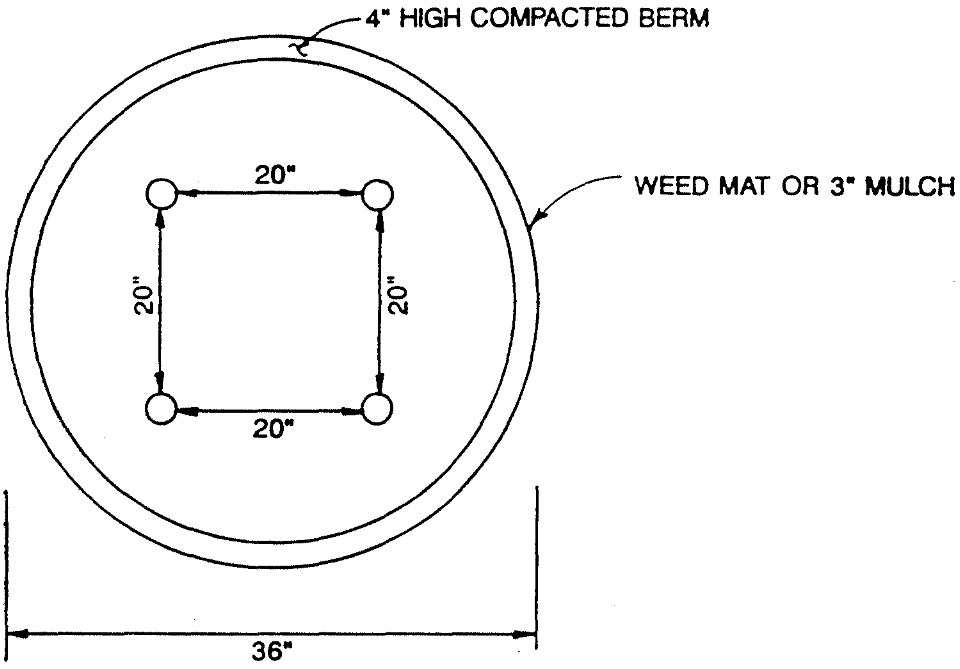
CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993



SLOPE PLANTING

PLAN VIEW



LEVEL GROUND PLANTING

PLAN VIEW

Not To Scale

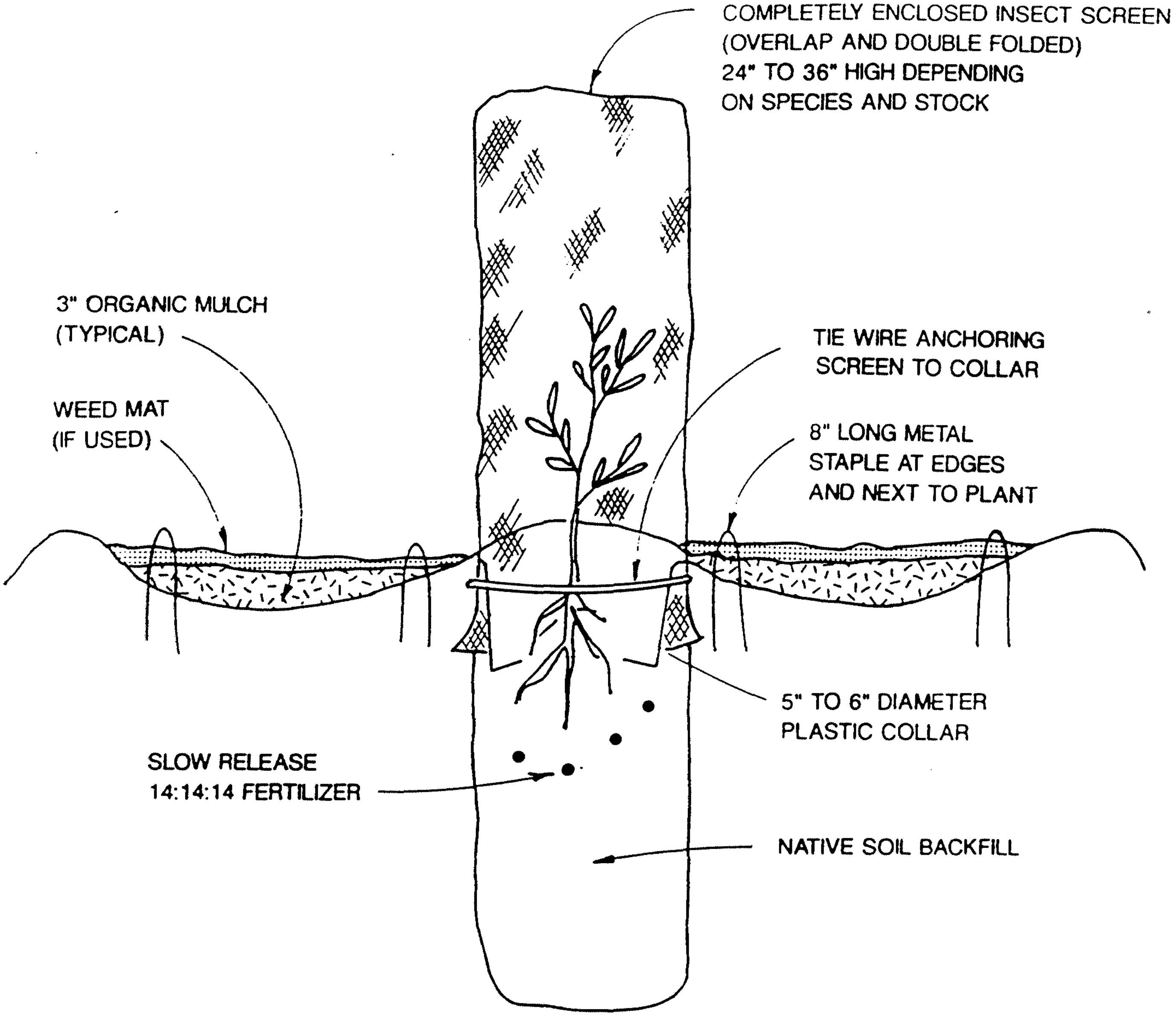
COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-8

MULTIPLE PLANTING OF PERENNIALS

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993



NOTES

1. ENCLOSED SCREEN 24" TO 36" HIGH TO BE OPENED AT THE TOP WHEN PLANT IS WITHIN 4" OF TOP. SIDES TO BE OPENED WHEN BRANCHES RESTRICTED.
2. COLLAR, ANCHOR WIRE, AND SCREEN TO BE REMOVED BETWEEN YEARS 3 AND 5, OR EARLIER IF PLANT GROWTH RESTRICTED.
3. COLLAR TO BE FILLED WITH WEED-FREE NATIVE TOPSOIL

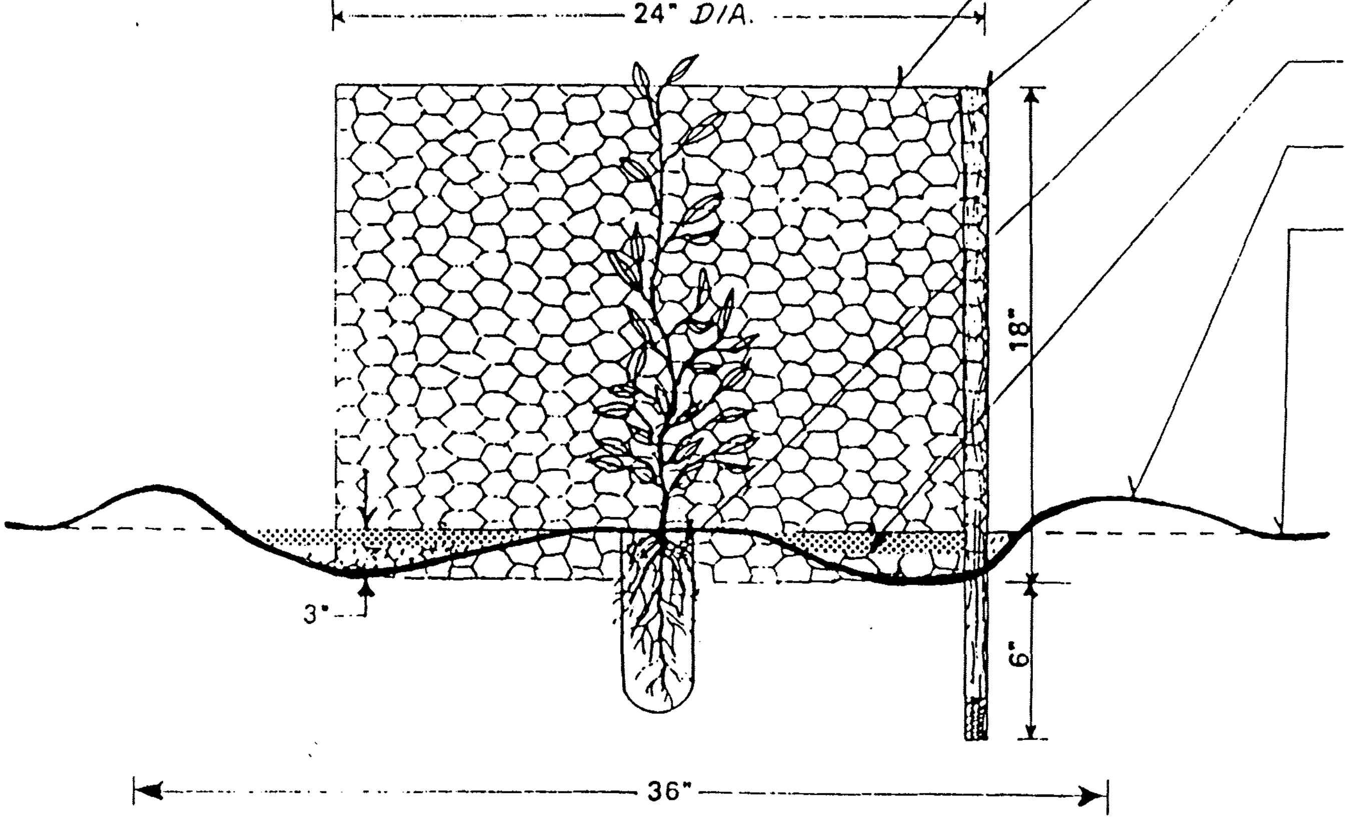
COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-9

PLANT PROTECTION DETAIL A

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993



1" mesh 78" X 18" chicken wire, Overlap ends. Staple to stake, top of wire flush with top of stake. Staples 3/8" heavy duty steel, minimum 5 per stake.

1" X 2" X 24" fir (or equal) stake driven 6" below soil grade.

Evenly spread 0.3 oz Osmocote 14-14-14, or equal, 1" below soil level

Weed mat or 3" mulch

4" high compacted earth berm

Finished grade

Not To Scale

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE C-10
PLANT PROTECTION
DETAIL B

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

SOURCE: SCVWD, 1992.

Table C-12
Noxious Plant Species Potentially Occurring in Reach 3

Common Name	Scientific Name
Tree of Heaven	*Ailanthus altissima*
Giant Reed	*Arundo donax*
Slender wild oats	*Avena barbata*
Wild oats	*Avena fatua*
Common beet	*Beta vulgaris*
Ripgut grass	*Bromus diandrus*
Fox-tail chess	*Bromus rubens*
Hoary cress	*Cardaria draba*
Italian thistle	*Carduus pycnocephalus*
Starthistle	*Centaurea spp.*
Bull thistle	*Cirsium vulgare*
Poison hemlock	*Conium maculatum*
Bindweed	*Convolvulus arvensis*
Horseweed	*Conyza canadensis*
Pampas grass	*Cortaderia selloana*
Jimson weed	*Datura stramonium*
Teasel	*Dipsacus fullonum*
Sweet fennel	*Foeniculum vulgare*
English ivy	*Hedera helix*
Prickly lettuce	*Lactuca serriola*
Dittander	*Lepidium latifolium*
Italian ryegrass	*Lolium multiflorum*
English ryegrass	*Lolium perenne*
Bull mallow	*Malva nicaeensis*
White sweet-clover	*Melilotus albus*

Continued

Table C-12
Noxious Plant Species Potentially Occurring in Reach 3

Common Name	Scientific Name
Tree tobacco	*Nicotiana glauca*
Smilo grass	*Oryzopsis miliacea*
Prickly ox-tounge	*Picris echioides*
Wild radish	*Raphanus sativus*
Ricinus communis	*Castor bean*
Himalaya berry	*Rubus procerus*
Curly Dock	*Rumex crispis*
Russian thistle	*Salsola kali var. tenuifolia*
Milk thistle	*Silybum marianum*
Small-flowered nightshade	*Solanum nodiflorum*
Sow thistle	*Sonchus oleraceus*
Turkey mullein	*Verbascum thapsus*
Periwinkle	*Vinca major*
Cocklebur	*Xanthium strumarium canadense*
Clotbur	*Xanthium spinosum*

1.8.7 Plant Protection from Browsing and Predation

1.8.7.1 Screen and Collar or Chicken Wire Enclosure Installation. Plants shall be protected from browsing by deer, rodents, and insects using collars and screens (see Figure C-6) or chicken wire enclosures (Figure C-7). A plastic collar shall be used to discourage gopher and other rodent damage, promote deep rooting, and anchor the screen. Screens protect plants from browse and also shade the young plants and allow some accumulation of moisture at night. Protective collars and screens described here shall be used for direct seeding, tubelings, dee pots, tree pots, and other container materials. Chicken wire enclosures may be used for screening to discourage browsing and to allow for some shade and moisture accumulation at night.

Collars (typically 1-quart size plastic containers or 1-gallon pots with bottoms removed) shall extend at least 4 inches underground and 1.5 inches aboveground. Screens shall consist of wire insect screen or approved material attached to the collar. Screens shall be at least 18 inches to 36 inches high, depending on the planting stock, and shall be wrapped around the upper portion of the collar and secured to the collar with tie wire. Screens shall be enclosed by overlapping and double-folding or a similar method to form an enclosed screen cylinder. Screens shall be opened at the top when the plant reaches within 4 inches of the top of the screen but left around the base of the plant for browse protection until the screen restricts branch growth.

1.8.7.2 Fencing. The pilot study recommends that above- and belowground fencing be used in addition to the individual screen and collar devices that surround individual seedlings. Based on the large number of gopher mounds and the evidence of other rodents in the revegetation areas, below-ground fencing is recommended to decrease the number of replanted stock required because of rodent damage. In addition to damage to planted stock, herbivores are known to cause damage to drip irrigation lines.

1.9 Irrigation

It is apparent that supplemental watering will be required to increase survival over the "very poor" classification seen in both the hand-watered and no-irrigation regimes of the pilot study. Very poor classification is described as survival performance of less than 60 percent in the first year, <50 percent in the second year, and less than 40 percent in the third year. Attachment A discusses survival according to propagule type and irrigation program.

Sites shall be fitted with a drip irrigation system before the woody species are planted and after site preparation and the establishment of a herbaceous groundcover have been completed. The pilot study recognized many common problems that are associated with the utilization of drip irrigation systems (HRG, 1991). Solutions for these problems, as outlined below, shall be incorporated into the overall irrigation design plan before implementation.

- Clogging of drip emitters
- Damage to drip system tubing by rodents

- Damage to plants from hot water heated by exposure of the black dripline tubing to the sun

The main irrigation lines shall be buried in shallow trenches to minimize rodent damage and heating water. Individual drip lines shall be laid on the ground surface for easy access during maintenance inspections. Mulching over individual driplines will help control water temperature—also, dripping will begin in the early morning hours (before 8:00 a.m.), when temperatures are low. Drip emitters shall be inspected at least every 2 weeks during the irrigation season.

1.9.1 Irrigation Frequency and Rate of Application

The ultimate goal is to establish a self-sustaining riparian forest; therefore, every effort shall be made to establish the riparian species and remove plants from supplemental water supplies as soon as survival criteria are ensured.

Watering shall occur from April through November, extended as needed in dry years. Supplemental irrigation shall continue for 3 years. Regular inspections outside the April through November period will be conducted the first year in any 3-week period where no rainfall is received.

Each plant will receive a minimum of 5 gallons a week during the first year, increasing to 20 to 30 gallons in the second and third year. During the first year, watering up to every 5 days may be needed.

Irrigation will continue at increased levels through years 2 and 3 to maximize plant growth in the early years. However, to avoid undue loss of plants in year 4 in the event of unusually hot or dry conditions, the irrigation system shall remain in place at least through year 5, to be used on an emergency basis if plants are observed to be suffering unusual water stress.

1.9.2 Irrigation Water Source

For the pilot study, irrigation water was obtained from the seasonal lake that is formed behind the temporary dam placed across Coyote Creek (HRG, Reaches 1A, 2B, December 13, 1990). Irrigation water for Reach 3 will most likely be pumped directly from the creek, although reclaimed water may be a potential source of water. If pumped from the creek, filters shall be required. Alternatively, a groundwater well could be used, depending on the results of groundwater testing.

1.10 Plant Maintenance Requirements and Records

The plant maintenance period shall extend over the proposed 5-year establishment period. Plant maintenance shall include pruning; weeding; watering; maintenance of the plant basin, weed mat or mulch, protection features; plant replacement; and record keeping.

1.10.1 Maintenance of Planting Basins

Berms around basins that become damaged in any manner causing them to lose their water-holding capacity shall be repaired. The watering basins shall be kept free of weeds, which compete for irrigation water and plant nutrients and are detrimental to plant growth. Weeds that grow through the fabric mulch shall be controlled by hand or by mechanical methods.

1.10.2 Maintenance of Irrigation System

The revegetation contractor shall be responsible for overseeing the irrigation operation and ensuring that the specified rate and frequency of supplemental water is delivered to all planted stock. This includes performing regular inspections of the dripline at least every 2 weeks; repairing the dripline system; repairing and inspecting the filter system, including cleaning if the filter is not self-flushing; and running and repairing the pump systems.

1.10.3 Fencing Maintenance

The fence surrounding individual revegetation sites shall be kept in good condition and repaired as soon as possible if damaged in any way. It will be the responsibility of the revegetation contractor to maintain and repair the fence.

1.11 Plant Replacement Requirements

The number of yearly reserve stock required for replanting due to unexpected mortality factors or first-year die off is to be calculated as the revegetation progresses, depending on the results of the monitoring. Plants shall be replaced annually, from October to December. The reserve stock shall be collected and contract-grown to be available as required. Plant replacement requirements are recommended based on the percentage of goal densities allowing for overplanting.

The density of planting originally recommended in the EIR (6- to 8-foot centers) is believed to be excessive for these revegetation sites. Some species planted on 6-foot to 8-foot centers in the pilot study, particularly the cottonwoods, were overly dense. The Corps' Sacramento River Bank Protection Program used 200 trees/acre, with a 75 percent survival rate. It has been noted at Coyote Creek, however, that wildlife usage of revegetation areas is greatly increased by plantings shrubs and herbaceous species. The plantings shown in the previous tables for each site represent an intermediate position based on the results and recommendations from the pilot study and the plantings in the vicinity.

The planting rates in the previous tables allow for a 75 percent survival rate to attain goal densities of about 200 trees per acre and about 600 shrubs or herbaceous species per acre. Although this is about 20 percent less than the densities used in the HEP analysis, (FR/EIS) these densities are believed to represent a more typical riparian community of the area.

1.12 Maintenance Records

Documentation of all maintenance activities will be required during the establishment period. Records will be submitted yearly to the Corps for review. First-year records shall include as-built plans, number of plantings by species and type, and locations of plantings. All annual reports shall include information on plant survivorship, types of maintenance performed as described in the Plant Maintenance Requirement sections, frequency of activities, irrigation times and dates, and observations of site environmental conditions. The report shall include an analysis of the year's growth and plant survivorship and any climatic or other environmental factors affecting these.

A 3-year and 5-year report will be produced summarizing data, describing modifications to maintenance activities that may have been developed, and making recommendations.

1.13 Contingency Measures

Should the revegetation plan fail to meet the established success criteria in these areas, corrective measures will be undertaken. The precise corrective measures can only be established after the causes of mortality are determined or estimated. Contingency measures will generally consist of review of the monitoring reports for possible determination of the causes for mortality (for instance, broken or plugged irrigation lines, diseased stock, inferior stock, damage to the plant protection), study of possible contributing factors, adjustment of those factors as feasible, and replacement of the lost plantings. The following is a discussion of contributing factors and measures by which those can be assessed or corrected. This is not an exhaustive analysis of the potential causes for failure, and site-specific analyses will be required if failure of the plantings is noted. A report discussing the additional studies conducted, the results of the analyses of contributing factors, and outlining remediation measures and proposed revegetation measures will be prepared and submitted to the California Department of Fish and Game and the US Fish and Wildlife Service prior to implementation of the proposed new plantings or remediation action.

1.13.1 Replacement Plantings

If the mitigation fails to meet the success criteria after 5 years, but a significant portion of the mitigation plantings have been successful, then additional plantings may be all that is needed to bring the project in line with the success criteria. Failure to meet success criteria could be linked to easily identifiable and correctable factors such as breaks in the irrigation lines, vandalism, damage to predator protection screens, or possibly the origin or handling of the planting stock.

An analysis should be conducted of the reasons for plant mortality; depending on the pattern of the unsuccessful plantings (grouped versus scattered throughout), additional studies may be required, such as additional sampling of soils, depth to groundwater, or simply review of monitoring notes on origin and handling of the material may be sufficient to determine possible contributing factors. Additional plantings will be undertaken, and monitored as planned for the original plantings. Irrigation needs, nursery growing conditions, origin of the stock, handling methods, are all examples of elements that can affect survival of plantings that could be adjusted relatively easily for new replacement plantings.

1.13.2 Species Composition Adjustment

Certain species may be more successful under the particular conditions of a site or a portion of the sites, and replacement plantings with a different species mix may be needed. A review of the survival/vigor of plantings by species may be all that is needed.

1.13.3 Problem Areas

In more serious problem areas, additional testing of soils and groundwater may be needed. Soils structure, composition, nutrients, water retention capacity, and soil moisture regimes may be responsible for success or mortality of plantings. Trenching to observe soil profiles, depth, and structure may be called for. Pockets of different soil types may require variations in irrigation needs for establishment, or may support a different species mix within a larger area. Examples of problems not readily observed would be occurrence of a hard pan or clay layer at depth blocking penetration faa roots, or pockets of alluvial cobbles that will not retain water for a long enough period once irrigation is halted. These can be dealt with in various ways, including soils amendments, creation of cracks or pits in the barrier layers, or more likely, adjustment of the species mix to more adequately reflect the micro-environment. Also, the potential for undiscovered groundwater or soils contamination may need to be verified, if other potential causes have been eliminated.

Depth to groundwater, and dramatic fluctuations in groundwater elevations, can also be an important factor in the survival of plantings. Comparison of areas where plantings are successful and areas where plantings have failed may reveal differences in topography that may be responsible for failure. The Reach 3 sites are at a higher elevation relative to the creek than Reach 2 plantings, and have a greater depth to groundwater that the pilot study area. The vegetation mix has been adjusted for this, but additional adjustments may be called for, depending on the results of the original plantings. Soils scientists and groundwater hydrologists should be consulted to assist in this evaluation. Monitoring wells may be required to determine the depth and fluctuations in groundwater at different locations, that can then be compared to planting success by species

1.13.4 Mitigation Area Adjustments

In extreme cases, new mitigation areas may need to be identified. This is a last resort measure that should only be used if other avenues prove unsuccessful. For instance, if depth to groundwater or seasonal fluctuations prove to be extreme, or soils contain impenetrable clay layers, and certain areas are judged to be unable to support a riparian woodland community even with adjustment of the species composition, then new locations within the Reach 3 corridor may be selected as providing a better micro-environment. Additional potential planting areas are limited within the lower reaches of Coyote Creek, and off-site mitigation should only be undertaken after serious study and if other corrective measures discussed above fail.

2. Mitigation Monitoring Plan

Monitoring of the Reach 1 marsh habitat, riparian revegetation sites, and fishery mitigation measures is required to meet the mitigation requirements of the FR/EIS and the construction permit conditions for Reaches 1 through 3. Several monitoring programs are already in place or are anticipated.

The Coyote Creek Flood Control Project Summary of Permit Conditions and Mitigation Requirements (HRG, 1990) is a preliminary report prepared for the Water District in 1990 that functions as a monitoring tool. This report evaluates the status of the mitigation measures or permit conditions required during the course of project implementation up to mid-1990. Table 6-4 of the GDM report is an updated version of this mitigation summary.

2.1 Reach 1 Marsh Area Monitoring

As a condition of Corps Permit 15962S49 issued for the construction of the test levee, a long-term management plan was prepared for the "bomb disposal area" (Harvey and Stanley, 1987). This report provided the groundwork for monitoring to be done in this portion of the project site. A draft "Monitoring and Management Plan for Reach 1A" has been reviewed and approved by the agencies (GDM). Portions of this monitoring program are already in place: for example, populations of the salt marsh harvest mouse are being monitored (Coyote Creek Flood Control Project Salt Marsh Harvest Mouse Monitoring Survey, Harvey and Associates, 1990). Additional monitoring to be performed includes the monitoring of soil attributes, vegetation distribution, and wildlife use of the waterbird pond.

2.2 Riparian Revegetation Monitoring

Monitoring of the survival and growth of the pilot site plantings has been conducted over a 3-year period. Data were collected on the survival of plant materials under various irrigation treatments and planting techniques. Measurements of height, spread, and vigor were also taken. An interim report on the first year of data was published by Stanley et al. (1988). A draft report of the 3-year study is presently under review by the Water District.

As required mitigation in the FR/EIS, wildlife use of the pilot revegetation site has been monitored since 1987. Annual wildlife monitoring as a mitigation in the FR/EIS was required for the first 10 years after planting, then at year 15, and at 10-year intervals thereafter for the life of the project. Annual monitoring of wildlife is required only at one of the revegetation sites (in this case, the pilot study) and will not be required for Reach 3. Instead, monitoring of the Reach 3 sites for vegetation and wildlife will occur every 5 years for the first 15 years and at 10-year intervals thereafter for the life of the project.

Although wildlife monitoring reports are required only for years 5, 15, and 55, three annual reports have already been prepared by the Coyote Creek Riparian Station (CCRS, 1988, 1989, 1990). Monitoring of wildlife use includes: (1) variable-radius circular-plot censuses conducted twice monthly for birds; (2) mist net transect sampling of birds conducted weekly; (3) breeding bird censuses conducted monthly from March to July; and (4) mammal, reptile, and amphibian sampling using live traps, conducted quarterly for mammals and during appropriate seasons for reptiles and amphibians.

In addition to direct wildlife observations, vegetation sampling is also being conducted to provide measurements of habitat variables that can be used to correlate with the wildlife studies. Over the 3 years of the study, the sampling procedures have been further refined for greater integration with the wildlife studies. In 1990, the vegetation was sampled twice, once during the winter, when foliage cover was at a minimum, and once in the summer, when foliage cover was at its maximum. Transect studies provided information on the relative cover of the species present. Canopy cover was also measured, along with foliar density. Frequency of occurrence and height of herbaceous species was also measured.

Groundwater monitoring was conducted in the area of the pilot revegetation project to evaluate the availability of groundwater for plant growth. Groundwater monitoring studies were expanded in 1990 to assist in the management of the salt marsh vegetation in Reach 1 and to evaluate the suitability of groundwater levels and salinity for riparian revegetation efforts in Reaches 1B and 2A (draft Monitoring and Management Plan for Reach 1A, HRG, in preparation; Lower Coyote Creek Flood Control Project Groundwater Monitoring Program for Reaches 1B and 2A, HRG, 1990).

Additional monitoring programs will be developed by the Water District to monitor revegetation efforts at Site 2 in Reach 2. Long-term monitoring for Reach 3 wildlife use should incorporate the types of monitoring used for the pilot study, including breeding and migratory bird census, and sampling for mammals, reptiles, and amphibians. A detailed monitoring plan shall be developed before implementation of Reach 3 revegetation plans.

2.3 Establishment Period Monitoring Plan, Reach 3

2.3.1 Objectives

Objectives of the establishment period monitoring program for the remainder of the revegetation effort will include:

- Ensuring that planting contract specifications have been met
- Ensuring that success criteria have been satisfied
- Identifying problems (actual and potential) so that they can be dealt with promptly
- Collecting information on plant performance to be used if replanting or reseeding is necessary

2.3.2 Development of Final Monitoring Plan

The monitoring period will include all revegetation sites and will extend for 5 years. If replanting of stock has been necessary to meet performance standards, the monitoring program will extend 2 years past the point at which newly planted vegetation has been weaned from any irrigation. If performance standards are not met at the end of the original 5-year period, the monitoring program may be extended. Annual monitoring reports will be prepared, and at the end of the fifth year of the restoration program, documentation will be provided for use in evaluating the success of the project against the performance standards. This documentation and the monitoring reports will be distributed to the Water District, CDFG, and USFWS.

2.3.3 Performance Criteria

Success criteria of 75 percent survival of the plantings shown in the previous tables is recommended. If planting rates are increased, the percentage of survival can be decreased. All planted stock will be evaluated twice yearly during the monitoring period to determine and document how well success criteria are being met. Twice yearly monitoring is recommended for two reasons. By evaluating vigor and survival rates in spring and fall, a more accurate assessment of the correlation with irrigation can be made. Also, sufficient lead time will be necessary for the collection and propagation of replacement stock, and twice yearly evaluations will allow for better prediction of collection needs. Species not meeting success requirements will be replanted, providing the cause of mortality can be identified and corrected before replanting. If mortality causal agents cannot be determined, replanting will be done with species exhibiting adequate survival on the site.

2.3.4 Frequency and Type of Monitoring Required

Monitoring will be conducted weekly during site preparation, daily during planting, and then a minimum of twice a month starting concurrently with contractor activities and ending concurrently with the end of fall planting.

The revegetation consultant will prepare an annual report in the fall of each year during the monitoring period. Information on survival, growth, and vigor of the planted woody species, condition of the herbaceous vegetation, replanting or reseeding needs, status of volunteer individuals, remedial actions taken over the past year, and any other relative data will be included.

Plant survival will be monitored twice a year; individual trees and shrubs will be tagged during the first year of implementation, catalogued, and surveyed for growth, vigor, and survival. Natural recruitment of trees and shrubs will also be monitored and included in the calculated densities used for success criteria.

Permanent photo points will be established within and overlooking the project area, to assist in evaluating overall community character. Panoramic photos will be taken twice annually at the same time each year, in spring and fall.

Irrigation monitoring visits will commence following 3 weeks without rain during the November to April period. If moisture levels within the root zone are too low to support root growth, irrigation will begin.

Appropriate data sampling and statistical treatment of data will be developed before final site planning. Performance standards will be established.

2.4 Fisheries Mitigation Monitoring Program

In order to assess the effectiveness of fishery mitigation measures incorporated into the Lower Coyote Creek Flood Control Project, it will be necessary to provide for post-project monitoring of biological and physical parameters. While no instream structural habitat mitigation measure will last indefinitely, a well-designed in-channel habitat structure, if regularly inspected and maintained, may be expected to last for 100 years (the life of the project). This section outlines the general inspection, maintenance, and biological monitoring required for the recommended fishery mitigation plan.

2.4.1 Existing Monitoring Program

In response to conditions mandated in Army Corps of Engineers Permit No. 15336S12A for Reach 2 of Coyote Creek, a monitoring program was developed to measure water temperatures, dissolved oxygen, and salinity factors within the project area. Eight water quality stations have been designated as part of this plan (Lower Coyote Creek Flood Control Project In-Stream Water Quality Monitoring Program for Reaches 1B and 2A). These factors are currently being monitored annually.

2.4.2 Fish Passage

Physical Features. To ensure the safe downstream passage of juvenile salmonids, regular inspection of the permanent Standish Dam replacement spill weir and sluiceway must be conducted a minimum of twice weekly. These inspections should occur within a day of storm events or any significant flow changes. A minimum depth of 5 to 6 inches of water should remain on the weir at the lowest passable flows (approximately 0.5cfs). Spills should run unimpaired down the sluiceway chute to within 1 foot of the natural streambed, at mean low tide, and should not discharge onto the concrete foundation of the dam. Debris must be kept clear of the weir, sluiceway, and downstream spill area.

Monthly inspections and maintenance of the baffled fish passageways at the SR 237 channel transition should be conducted. Any accumulated debris and sediments must be removed to maintain effective fish passage conditions at this structure.

Biological Features. Successful fish passage performance of each of these mitigation measures is best measured by conducting surveys in the project reaches to ascertain the presence of migratory species (*i.e.*, salmon and steelhead). The presence of these species will be partially dependent on the provision of adequate water flows in the creek during the spawning seasons from November through April. The surveys should be initiated in

November and continue at least monthly through May to locate adult salmon and/or steelhead during their spawning migrations.

Since fish passage could be impeded at the dam or at SR 237, data will be needed on fish presence in each of the reaches, both upstream and downstream of the potential blocks. In this way, fish presence or absence can be more closely correlated to possible blockage of movement.

Sampling for juvenile salmon and steelhead in the project reaches should also be conducted. This should be conducted by electrofishing throughout the project reaches beginning in February and continuing at monthly intervals through June. As an alternative, one or more fyke-net sampling stations may be established at appropriate locations along the project reaches to capture downstream migrant juvenile salmon and steelhead. This method will allow for the detection of successful adult passage and subsequent spawning, as well as quantification of juvenile production. Fyke-netting may not be effective or appropriate if water velocities are not high enough to permit their use ($\geq$1fps) or if vandalism is a problem in the area.

2.4.3 Instream Habitat

Physical Features. Primary physical measurements must be made of gravel embeddedness and gravel depth at the spawning riffle restoration and monitoring sites, to evaluate their quality. These measurements must be made after the winter flood season but before the onset of the fall spawning season. The methods of Platts (1983) have been successfully used for similar evaluations. Generally, gravel embeddedness less than 10 percent and gravel depths ranging from 1 to 2 feet should provide suitable conditions for salmon and steelhead spawning. Streamflows that are regulated upstream from the project reaches will have a significant effect on water velocity and water depth and, thus, on the overall quality and usability of this habitat. The rocky riffle habitat will require monthly inspection. Accumulated urban debris should be removed from the riffles. Natural debris may be left in place.

Biological Features. Annual fish sampling in each of the habitat types, including restored and natural undisturbed sites, for all project reaches should be conducted throughout the year at regular intervals (about four to six times). Fish abundance in each habitat type should be compared to baseline pre-project abundances reported by HRG (1989). The goal should be equivalent or higher fish abundances and similar species composition throughout the project reaches.

Spawning riffle utilization should be assessed during surveys directed at locating the presence of migrating adult salmon and steelhead. These surveys should be conducted at least monthly beginning in November and continued through May to locate and count redds and observe spawning activity. The presence of redds and/or observation of spawning activity on the restored riffles shall be measures of successful mitigation. In addition, sampling for and capturing juvenile salmon and steelhead as described previously shall provide an additional indication of success for this mitigation objective.

Because of the annual rainfall variability in the region and the upstream water withdrawals, use of the stream for spawning by anadromous salmonids will be highly variable. Salmon and steelhead will use the stream during years when adequate streamflows occur. Evaluation of anadromous salmonid use of restored habitat in lower Coyote Creek must account for this inter-annual variability. Therefore, these evaluations will have to be conducted for several years.

2.4.4 Stream Shading

This monitoring effort and methodology is described in "Revegetation and Monitoring Plan for Establishment of Riparian Trees and Shade-Levels on Coyote Creek, Reaches 1B and 2A—December 13, 1990," prepared by the Habitat Restoration Group. The method described in this plan, which uses a shade model (SSHADE), can be effectively applied to other reaches.

3. References

(1) Habitat Restoration Group (HRG). 1991. Third Year Monitoring Report for the Coyote Creek Revegetation Project.

(2) Habitat Restoration Group (HRG). 1990. Lower Coyote Creek Flood Control Project Groundwater Monitoring Program for Reaches 1B and 2A.

(3) Habitat Restoration Group (HRG). 1990. Revegetation and Monitoring Plan for Establishment of Riparian Trees and Shade Levels on Coyote Creek, Reaches 1B and 2A. December 13, 1990.

(4) Habitat Restoration Group (HRG). 1989. Lower Coyote Creek Fisheries Evaluation Report. Prepared for the Santa Clara Valley Water District, San Jose, California. File No. 182-19. 49p. + four appendices.

(5) Platts, W.S., W.F. Megahan, and G.W. Minshall. 1983. Methods for evaluating stream, riparian, and biotic conditions. US Forest Service, Intermountain Forest and Range Experiment Station, Gen. Tech. Report INT-138. 70p.

(6) Harvey, H.T. and J. Stanley. 1987. Wetland Habitat Management Plan for the Lower Coyote Creek Flood Control Bypass Channel. ("Bomb Disposal Area"). HRG 182-07. March 24.

(7) Harvey and Associates. 1990. Coyote Creek Flood Control Project Salt Marsh Harvest Mouse Monitoring Survey.

(8) Stanley, J. T., L. R. Silva, H. C. Appleton, M. S. Marangio, W. J. Lapaz, and B. H. Goldner. 1990. Coyote Creek Pilot Revegetation Site Interim Monitoring Report, published as "Coyote Creek (Santa Clara County) Pilot Revegetation Project" in: *Proceedings, California Riparian Systems Conference*, September 22-24, 1988.

(9) Coyote Creek Riparian Station (CCRS). 1990. Coyote Creek Wildlife Monitoring Annual Report: July 1989-June 1990.

(10) Coyote Creek Riparian Station (CCRS). 1989. Coyote Creek Wildlife Monitoring Annual Report: July 1988-June 1989.

(11) Coyote Creek Riparian Station (CCRS). 1988. Coyote Creek Wildlife Monitoring Annual Report: July 1987-June 1988. December 15.

(12) U.S. Army Corps of Engineers. 1993. Final General Design Memorandum, Coyote and Berryessa Creeks, California, Coyote Creek. 1993.

(13) U.S. Army Corps of Engineers. 1993. Final Environmental Assessment for the Coyote Creek Project Element of the Coyote and Berryessa Creeks, California Project.

Attachment A
Pilot Study Results Discussion

Attachment A
Pilot Study Results Discussion

A.1 Propagule Types

Box elder *Acer negundo* ssp. *californicum*: Bare root propagules were classified as showing a very good survival rate in both sprinkler and flood irrigation regimes at 112.5 percent (the increase above 100 percent survival was attributed to sampling error) and 81.8 percent, respectively. A good survival rate was obtained by planting seeds at 75.0 percent and 65.2 percent, respectively. Planting 1-gallon container stock yielded a poor survival rate of 45.5 percent and 65.8 percent, respectively.

White Alder *Alnus rhombifolia*: Transplanted seedlings were tested in the sprinkler irrigation regime only, but they showed a very good survival rate of 91.7 percent. One-gallon stock, tested in both sprinkler and irrigation regimes, and leach tube stock, tested only with sprinkler irrigation, showed very poor survival rates. The one-gallon stock had a survival rate of 31.7 percent and 4.8 percent respectively, with an 11.1 percent survival rate of leach tube stock. According to pilot study results, transplant collection may be difficult since it is necessary to collect transplants in the correct stage of development, at a suitable height, and with the permission of the landowner. Since transplants are basically bare root seedlings collected from the site rather than nursery-grown, it is suggested that bare root plants may show good potential for use in future plantings instead of transplants.

California Black Walnut *Juglans hindsii*: The 1-gallon container stock showed the highest rate of survival at 47.1 percent and was classified as poor for sprinkler-irrigated plants and as very good, at 80 percent, when flood irrigated. The pilot study results suggest that the very good survival rate for 1-gallon stock in the flood irrigation regime is not representative due to the small sample size. The survival rate for direct seeding was classified as fair at 52.5 percent and poor at 46.0 percent, respectively; the height and spread for seeded seedlings was greater than for 1-gallon stock. The pilot study results suggest that higher survival rates of directly seeded stock may be obtained by placing more than the 3 seeds per planting site used in the pilot study.

Western Sycamore *Platanus racemosa*: One-gallon stock was the only stock type used in the pilot study. Survival rates for this type of stock range from poor, at 45.7 percent for sprinkler-irrigated plants, to very good, at 78.5 percent for flood-irrigated plants.

Fremont Cottonwood *Populus fremontii*: Pole cuttings had very good survival rates in both sprinkler and flood irrigation regimes. Pole cuttings had a survival rate of 85.9 percent and 82.6 percent, respectively, with a mean height for both irrigation treatments of 22 feet after 3 years. Leach tube stock and short cutting propagules performed very poorly in both irrigation regimes.

Coast Live Oak *Quercus agrifolia*: One-gallon stock showed higher survival rates than direct seeded stock. The sprinkler-irrigated 1-gallon stock showed a very poor survival rate of 33.3 percent, while the flood-irrigated stock was classified as very good, at 71.4 percent. However, the sample size for the 1-gallon size stock is small, and should not be viewed as representative. Direct seeding yielded very poor results for both irrigation regimes, with survival at 27.3 percent and 30.7 percent, respectively. The pilot study suggested that an increase in the survival rate may be obtained by using higher quality source seed and placing more than the 3 seeds used in the pilot study in each planting hole.

Valley Oak *Quercus lobata*: One-gallon stock showed an increased rate of survival and greater mean height than either seed or 4-inch propagule types. The results of 1-gallon stock were classified as good at 67.2 percent and very good at 83.2 percent, for sprinkler and flood irrigation regimes. Sprinkler-irrigated seeds had a fair rate of survival at 53.4 percent; irrigated seeds had good survival at 60.3 percent. The pilot study had two separate sources of valley oak one-gallon stock, and these showed differences in mean height performance. The pilot study results suggest that either a combination of the seed source or the handling method by the nursery could be the reason for the difference in mean height performance. Care must be taken in obtaining high quality seed and in the nursery treatment of contract-grown stock.

Willow *Salix* sp.: Short willow cuttings had higher survival rates in both sprinkler and irrigation regimes than 1-gallon stock. Short cuttings showed a poor rate of survival, at 45.5 percent, and a fair rate, at 50.0 percent, respectively. One-gallon stock showed a very poor survival rate of 18.5 percent when sprinkler-irrigated and a poor rate, at 41.7 percent, when flood-irrigated. The pilot study results suggest that, based on very good performance of Fremont cottonwood pole cuttings, willow pole cuttings would be expected to show an increase in survival rate over short cuttings.

Blue Elderberry *Sambucus mexicana*: Short cuttings and seed propagule types showed very poor performance when sprinkler- and flood-irrigated. Leach tube stock had a very good survival rate of 83.0 percent and a good rate of 65.7 percent for sprinkler and flood irrigation regimes, respectively. It is suggested that further plantings may obtain an increase in survival by using larger sized tubes that would allow for increased root development prior to planting.

California Bay *Umbellularia californica*: One-gallon stock showed greater growth and higher survival than seed showed in both sprinkler and flood irrigation regimes. The seed stock showed very poor performance in both irrigation regimes, at 12.5 and 0 percent, respectively. The sample size of the direct seeded plantings was small, however, and may not be representative. The 1-gallon stock showed a survival rate of 43.6 percent and 86.7 percent, respectively.

Oregon Ash *Fraxinus latifolia*: Bare root and 1-gallon stock showed both very good and fair survival rates. The bare root stock showed a very good survival rate of 77.8 percent and 103.7 percent, for sprinkler and flood irrigation, respectively; the 1-gallon stock showed a fair survival rate of 54.8 percent and a very good survival rate of 100 percent, respectively.

California Blackberry *Rubus vitifolius*: Leach tubes were the only stock size tested in the pilot study for this species. The sprinkler-irrigated plants reflected a poor survival rate, at 44.4 percent, and flood-irrigated plants showed a very poor performance of 0 percent. The pilot study results suggest that larger tubes may increase survival and should be considered for future plantings.

California Rose *Rosa californica*: The pilot study tested the percentage of survival of leach tubes in the sprinkler and flood irrigation regimes and of seed in the sprinkler regime. The leach tubes had a higher survival rate than the seed propagule type, with a good rate of 66.7 percent and a fair rate of 54.6 percent, respectively. Seeded areas showed a very poor survival rate of 30.8 percent. It is suggested that larger leach tubes be used in future plantings.

Mugwort *Artemisia douglasiana*: The only stock size tested for this species was leach tubes, and performance was classified as very poor in both sprinkler and irrigation regimes. Those plants that were sprinkler-irrigated showed a survival rate of 33.3 percent, and those that were flood-irrigated showed a survival rate of 15.4 percent. The results of the pilot study suggest that increased survival may be obtained by the use of larger stock.

A.2 Plant Installation

The pilot study determined that fabric mulch provided better protection from weed invasion than a wood bark mulch over the establishment period (typically 3-5 years). Fabric mulch is initially more expensive in terms of cost, labor, and materials, but this initial increase in cost is offset over the length of the establishment period by the increased maintenance costs that would be associated with the use of a wood bark mulch. The fabric mulch used in the remainder of the revegetation effort will be of similar material to the fabric mulch used in the pilot study. However, recent plantings of cuttings by the water district used a bark mulch successfully.

Eight propagule types and nursery stock container sizes were tested at the pilot study site. These are: seeds, short cuttings, 1-gallon containers, leach tubes, bare root propagules, 4-inch pots, transplants, and pole cuttings.

The planting techniques used for each type are listed below. All plantings, with the exception of seeds and pole cuttings, were protected from herbivory by a photo-degradable seedling protection tube. Seeds were protected from herbivory by direct seeding into protective collars with screens. A slow release fertilizer tablet was placed into the planting holes (HRG, 1991).

- Seeds. All seeds were directly seeded into protective collars, with sterile soil used as a medium in the top 3 inches of soil.

- Short cuttings. The slant end of the cutting was dipped in rooting hormone prior to being placed into augured holes.

- One-gallon containers. Purchased 1-gallon container stock was planted directly into native soil.

- Leach tubes. Purchased leach tube super cells, or tubelings, 1-1/2 inch x 9 inches deep, were installed directly into native soil.

- Bare root propagules.

- Four-inch pots. Purchased 4-inch pots stock was placed directly into native soil.

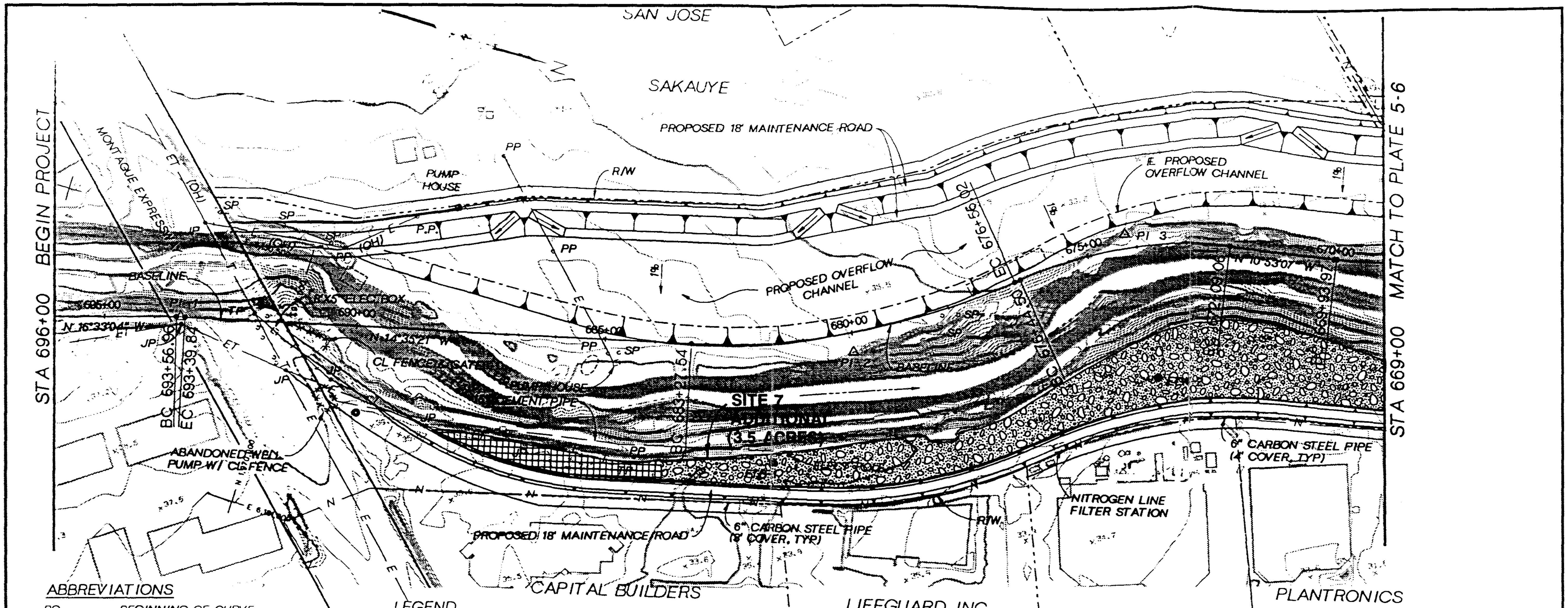
- Transplants. White alder transplants were taken directly from a site near Santa Cruz and planted in native soil.

A.3 Irrigation Methods

The pilot study tested the effect on species survival of four irrigation regimes per stock type. The regimes tested were: flood irrigation, sprinkler irrigation, hand watering, and no irrigation. Using the overall percentage of plant survival at the end of the 3-year monitoring period, those species that were flood-irrigated had the highest overall percent survival at 61.0 percent. Species that were sprinkler-irrigated had the next highest rate of overall plant survival at 53.7 percent. Hand-watered species had a survival rate of 27.5 percent; species that were not irrigated had a survival rate of 27.4 percent.

It was the intention of the pilot study to test flood and sprinkler irrigation techniques rather than more commonly used methods, such as drip irrigation, for which supporting data exist (HRG, 1991). However, it is the opinion of the study site restorationists that drip irrigation would be more cost effective than the tested regimes, once the real costs of increased weed control and maintenance are calculated into the cost of flood and sprinkler irrigation techniques. In addition, the scarcity of a year-round fresh water source for the remaining 28.5 acres eliminates the more water-intensive irrigation methods, in practical terms.

The pilot study restorationists hypothesized that since the groundwater table was relatively high, no irrigation, or a low frequency of irrigation, would be sufficient to establish Zone 1 species that are found closer to Coyote Creek; thus, they would rely less on supplemental water sources for Zone 1 than for Zone 2 species. To test this hypothesis, the pilot study planted 204 Fremont cottonwoods in Zone 1 and measured the survival rate over the 3-year period of the pilot study. The rate of survival of pole cuttings that received no supplemental irrigation was 43.1 percent, which was classified as poor (HRG, 1991). Pole cuttings that received sprinkler irrigation had a survival rate of 85.9 percent, while those receiving flood irrigation had 82.6 percent; the pole cuttings showed a growth rate of 22.9 feet and 24.6 feet, respectively. Other riparian species that also received no supplemental water showed a 0 percent survival rate at the end of the 3-year monitoring period (HRG, 1991). although of the sample size was low.


SAN JOSE
SAKAUYE
STA 696+00 BEGIN PROJECT
STA 669+00 MATCH TO PLATE 5-6
MONTAGUE EXPRESSWAY
PROPOSED 18' MAINTENANCE ROAD
PUMP HOUSE
PP
R/W
SP
P.P.
(OH)
E PROPOSED OVERFLOW CHANNEL
PROPOSED OVERFLOW CHANNEL
BASELINE
695+00
690+00
685+00
680+00
675+00
670+00
PI 1
PI 2
PI 3
N 16°33'04" W
N 14°35'21" W
N 10°53'07" W
BC 693+56.06
EC 693+39.84
EC 676+55.02
ELEC BOX
CL FENCE
SITE 7 ADDITIONAL (3.5 ACRES)
ABANDONED WELL PUMP W/ CL FENCE
6" CARBON STEEL PIPE (4' COVER, TYP)
NITROGEN LINE FILTER STATION
PROPOSED 18' MAINTENANCE ROAD
6" CARBON STEEL PIPE (8' COVER, TYP)
R/W
CAPITAL BUILDERS
LIFEGUARD INC.
CULLMAN
PLANTRONICS

GRAPHIC SCALE

0 50' 100' 200' 300' 400' 500'

1" = 200'

ABBREVIATIONS

BC	BEGINNING OF CURVE
CMP	CORRUGATED METAL PIPE
EC	END OF CURVE
EL/ELEV	ELEVATION
EXIST	EXISTING
INV	INVERT
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NTS	NOT TO SCALE
MH	MANHOLE
PI	POINT OF INTERSECTION
R/W	RIGHT-OF-WAY
STA	STATION
PP	POWER POLE
TP	TELEPHONE POLE
JP	JOINT POLE
OH	OVERHEAD
SP	STAND PIPE
IP	IRRIGATION PIPE
CL	CHAIN LINK
CONC	CONCRETE

LEGEND

————————	NATURAL CHANNEL FLOWLINE
—— —— ——	OVERFLOW CHANNEL INVERT
——— — — —	RIGHT-OF-WAY
—— W ——	WATER LINE
—— G ——	GAS LINE
—— T ——	TELEPHONE LINE
—— E ——	ELECTRIC LINE
—— N ——	NITROGEN GAS LINE
—— ET ——	ELECTRIC & TELEPHONE LINE
—X—X—	CHAIN LINK FENCE
—— SD ——	STORM DRAIN LINE
△	POINT OF INTERSECTION (PI)
- - - - - - - - - -	EXIST EASEMENT

BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 1			1,969,790.51	6,150,680.96	01°57'43"	500'	17.12'	8.56'
	N 14°35'21" W	1363.20'						
PI 2			1,971,109.76	6,150,337.59	27°28'56"	1400'	671.52'	342.35'
	N 42°04'17" W	577.13'						
PI 3			1,971,538.17	6,149,950.88	31°11'10"	800'	435.44'	223.26'
	N 10°53'07" W	1032.82'						

GENERAL NOTES (PLATES 3-83 THRU 3-88):

1. ELEVATIONS REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND ARE BASED ON SANTA CLARA VALLEY WATER DISTRICT BENCH MARKS: 64 AND 347 AND NGS BENCH MARKS G-148 AND COYOTE.
2. GRID COORDINATES REFER TO THE NORTH AMERICAN DATUM 1983 CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE-3 ALL DISTANCES ARE GROUND LEVEL DISTANCES.
3. PROFILE STATIONING IS MEASURED ALONG THE BASELINE.
4. "LEFT" AND "RIGHT" REFERS TO LOOKING DOWN STREAM.
5. Q(1%) = 14,500 CFS; N=0.07 IN EXISTING CHANNEL & REVEGETATION AREAS; N=0.035 IN OVERFLOW CHANNELS & ROCK LINED AREAS.
6. ARMORING AGGREGATE SHALL BE PLACED 10" THICK W/ 2" A.B. ON TOP ON MAINT. ROADS INSIDE CHANNEL AS SHOWN ON PLAN.
7. PROPOSED RAMPS TO BE CONSTRUCTED AT 10% GRADE.
8. EASEMENT RESERVED FOR PUBLIC AND UTILITY PURPOSES, TASMAN DRIVE.

LEGEND

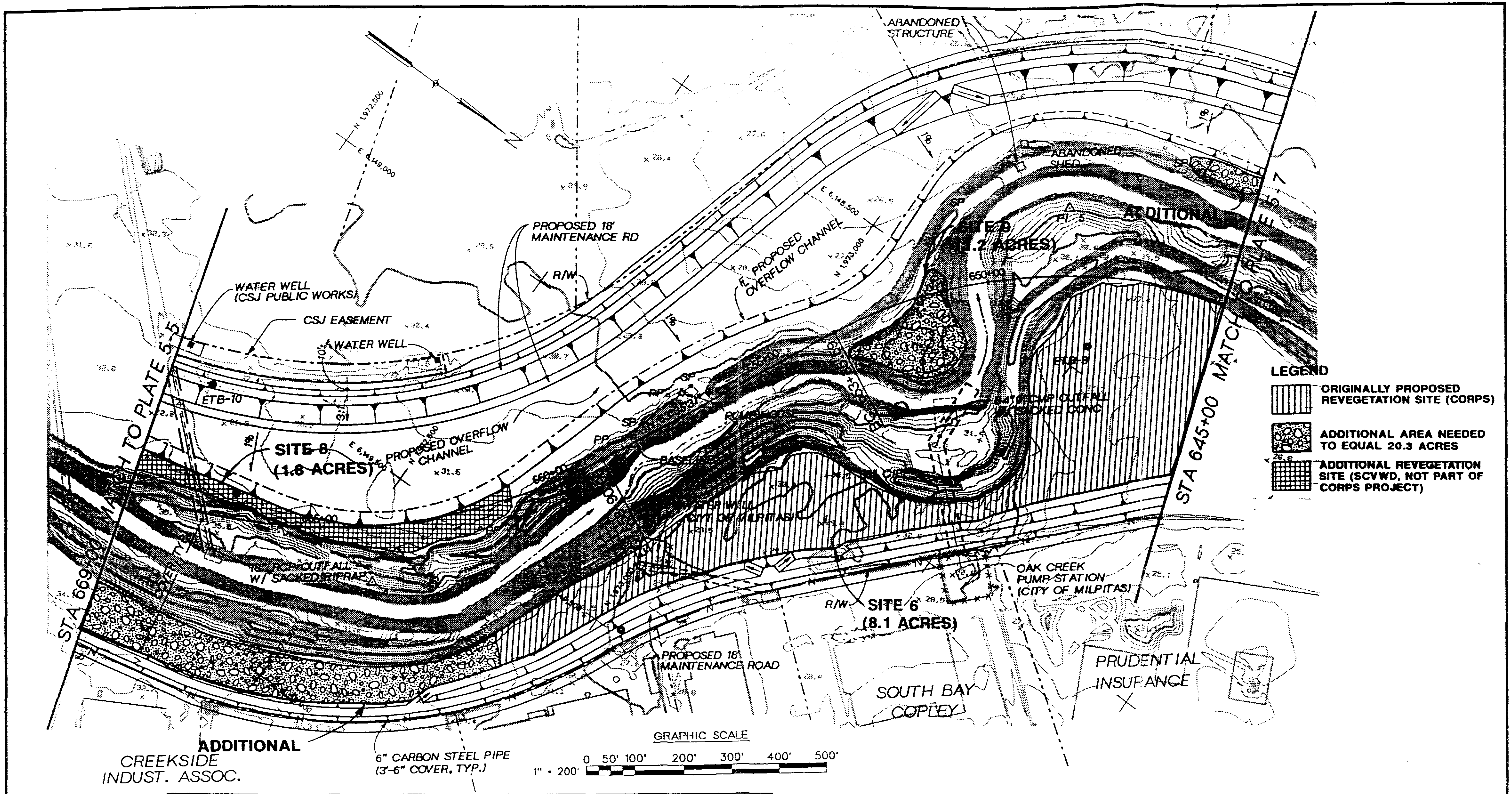
▨	**ADDITIONAL AREA NEEDED TO EQUAL 20.3 ACRES**
▦	**ADDITIONAL REVEGETATION SITE (SCVWD, NOT PART OF CORPS PROJECT)**

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
PLATE C-1

MITIGATION MEASURES

CH2M HILL
SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

SFO31213.A1


ABANDONED STRUCTURE
ABANDONED SHED
N 1,972,000
E 6,149,000
E 6,148,500
N 1,973,000
PROPOSED 18' MAINTENANCE RD
R/W
PROPOSED OVERFLOW CHANNEL
WATER WELL (CSJ PUBLIC WORKS)
CSJ EASEMENT
WATER WELL
ETB-10
SITE 8 (1.6 ACRES)
PROPOSED OVERFLOW CHANNEL
SITE 9 (3.2 ACRES)
ADDITIONAL
PI 5
650+00
ETB-9
84" CMP OUTFALL W/ SACKED CONC
BASELINE
WATER WELL CITY OF MILPITAS
RCP OUTFALL W/ SACKED RIPRAP
OAK CREEK PUMP STATION (CITY OF MILPITAS)
R/W
SITE 6 (8.1 ACRES)
PROPOSED 18' MAINTENANCE ROAD
SOUTH BAY COPLEY
PRUDENTIAL INSURANCE
STA 669+00
MATCH TO PLATE 5-5
STA 645+00 MATCH TO PLATE 5-7
ADDITIONAL
CREEKSIDE INDUST. ASSOC.
6" CARBON STEEL PIPE (3'-6" COVER, TYP.)
GRAPHIC SCALE
0 50' 100' 200' 300' 400' 500'
1" = 200'
LEGEND
ORIGINALLY PROPOSED REVEGETATION SITE (CORPS)
ADDITIONAL AREA NEEDED TO EQUAL 20.3 ACRES
ADDITIONAL REVEGETATION SITE (SCVWD, NOT PART OF CORPS PROJECT)

BASELINE CONTROL

PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 4			1,972,552.41	6,149,755.84	52°42'24"	1200'	1103.89'	594.47'
	N 63°35'31" W	1636.67'						
PI 5			1,973,280.34	6,148,289.96	51°59'53"	1000'	907.54'	487.71'
	N 11°35'38" W	960.98'						

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

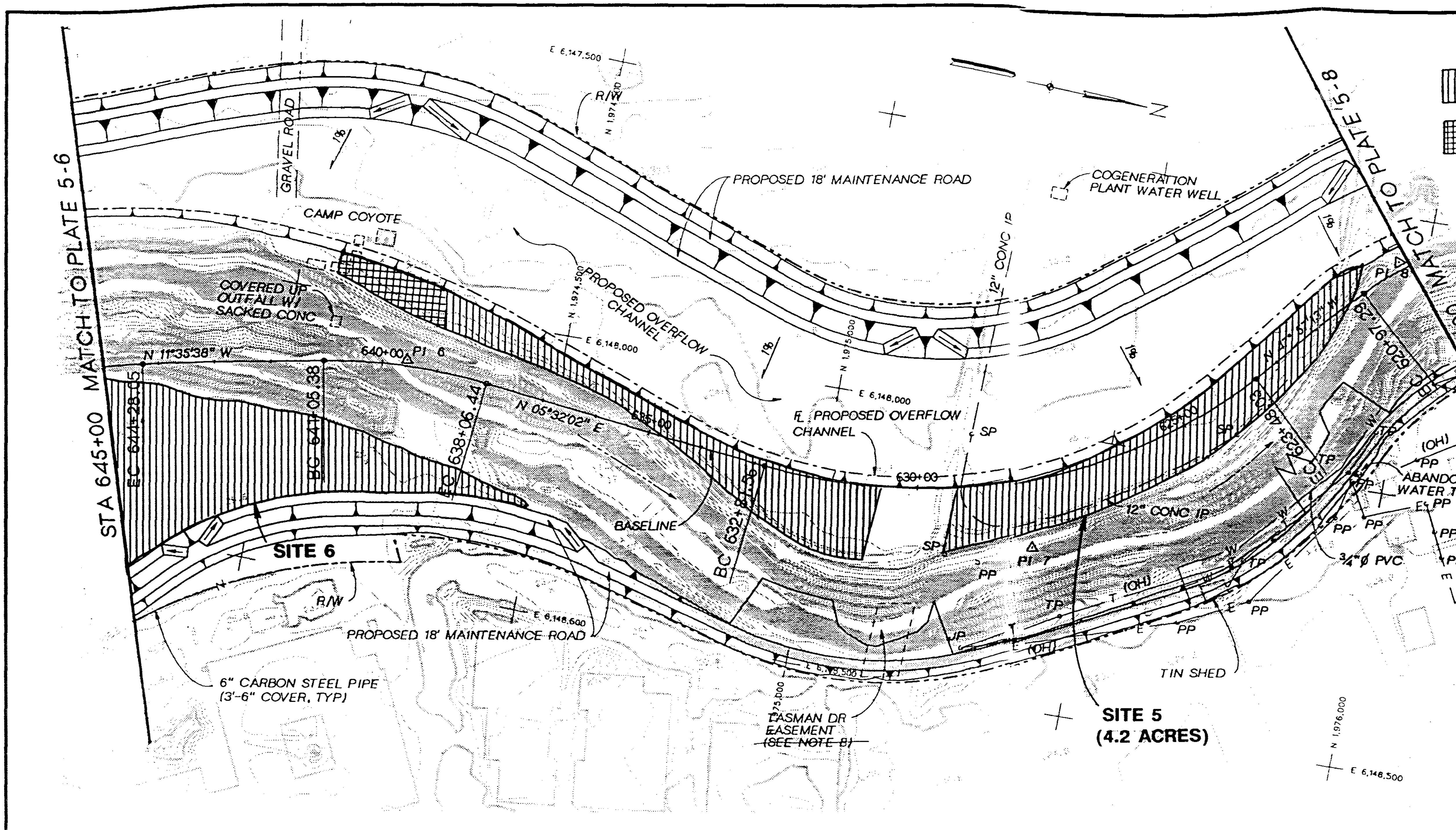
PLATE C-2

MITIGATION MEASURES

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

SFO31213.A1



LEGEND

▥ ORIGINALLY PROPOSED REVEGETATION SITE (CORPS)

▦ ADDITIONAL REVEGETATION SITE (SCVWD, NOT PART OF CORPS PROJECT)

GRAPHIC SCALE

1" = 200' 0 50' 100' 200' 300' 400' 500'

BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	Δ	R	L	T
PI 6			1,674,221.71	6,148,096.83	17°07'39"	1000'	298.93'	150.59'
	N 05°32'02" E	1179.38'						
PI 7			1,975,395.59	6,148,210.56	53°29'14"	1000'	933.53'	503.90'
	N 47°57'13" W	868.94'						
PI 8			1,975,977.55	6,147,565.28	25°45'12"	500'	224.74'	114.30'
	N 22°12'01" W	202.97'						

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

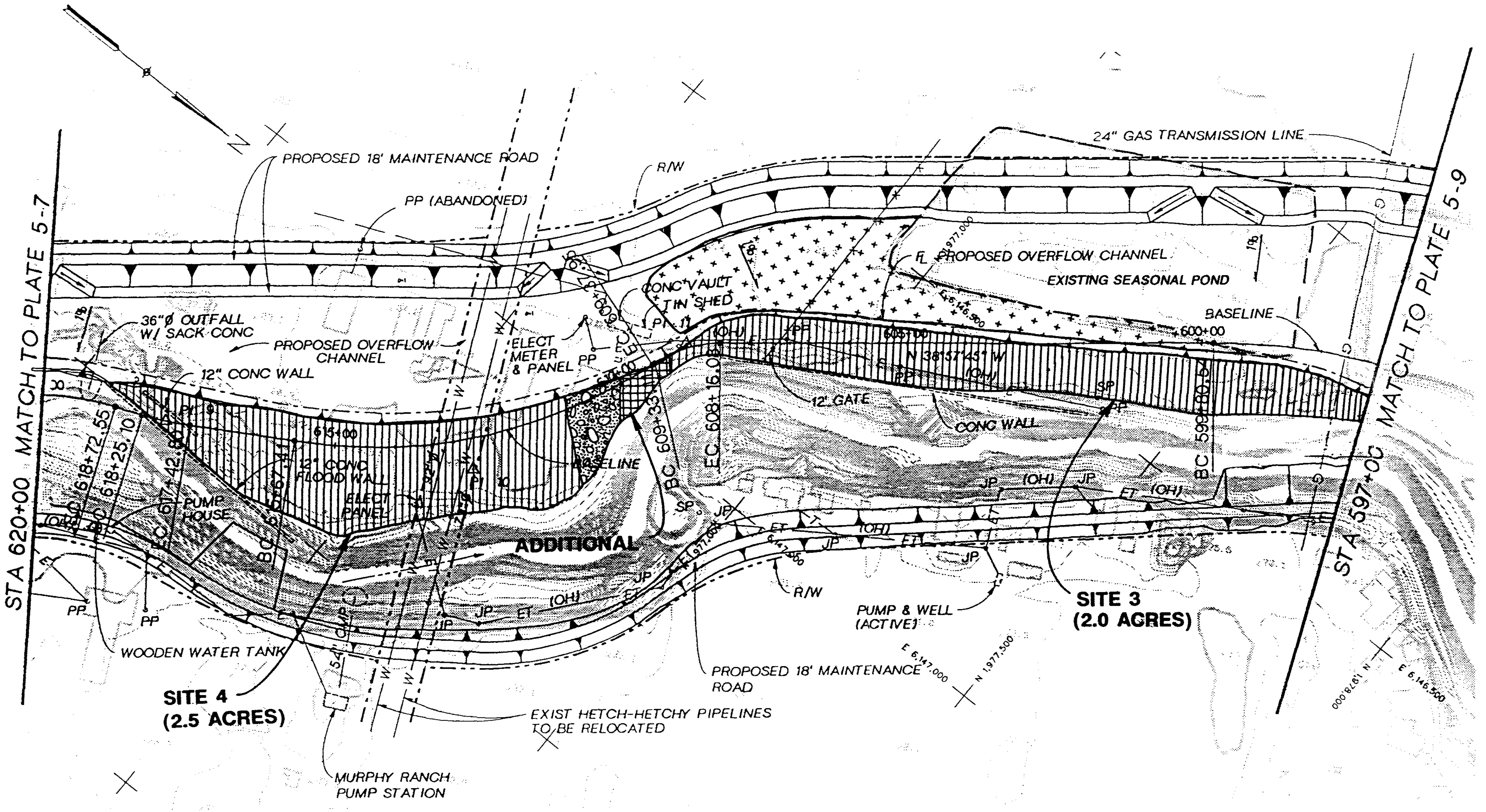
PLATE C-3

MITIGATION MEASURES

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

SFO31213.A1



LEGEND

▥	ORIGINALLY PROPOSED REVEGETATION SITE (CORPS)
▒	ADDITIONAL AREA NEEDED TO EQUAL 20.3 ACRES
▦	ADDITIONAL REVEGETATION SITE (SCVWD, NOT PART OF CORPS PROJECT)
+	PROPOSED SEASONAL POND MITIGATION AREA

BASELINE CONTROL

PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	Δ	R	L	T
PI 9			1,976,165.47	6,147,488.59	7°51'35"	600'	82.31'	41.22'
	N 30°03'36" W	546.55'						
PI 10			1,976,638.51	6,147,214.82	42°25'46"	850'	629.45'	329.94'
	N 72°29'21" W	395.04'						
PI 11			1,976,757.37	6,146,838.09	33°31'37"	200'	117.03'	60.24'
	N 38°57'45" W	2024.52'						

GRAPHIC SCALE

0 50' 100' 200' 300' 400' 500'

1" = 200'

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

PLATE C-4

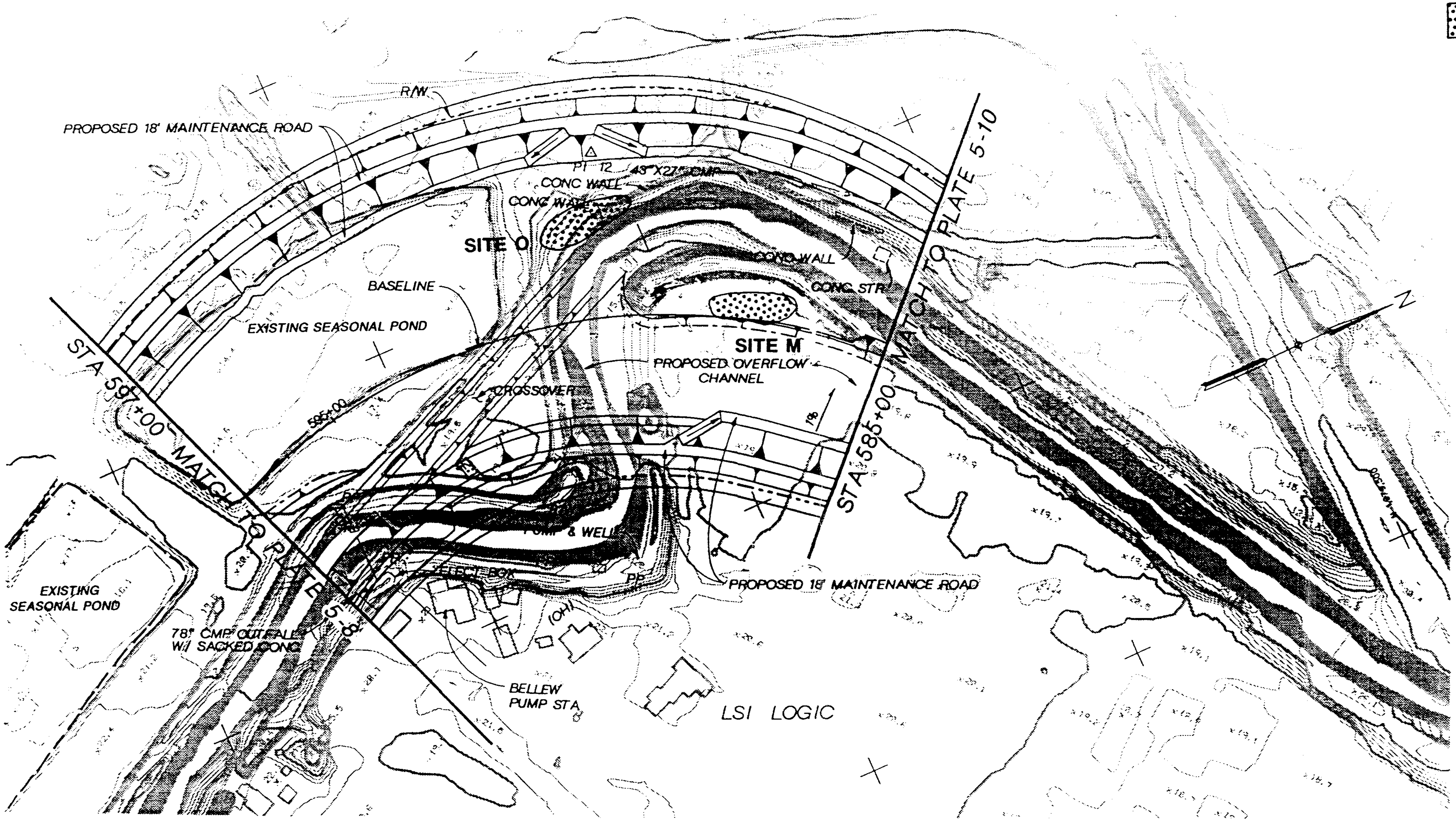
MITIGATION MEASURES

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

LEGEND

▨ SHADE PLANTING SITE



BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 12			1,978,331.55	6,145,565.05	96°55'18"	1000'	1691.60'	1128.74'
	N 57°57'33" E	3117.48'						
PI 13			1,979,985.45	6,148,207.64	99°24'52"	500'	867.55'	589.73'

GRAPHIC SCALE

1" = 200' 0 50' 100' 200' 300' 400' 500'

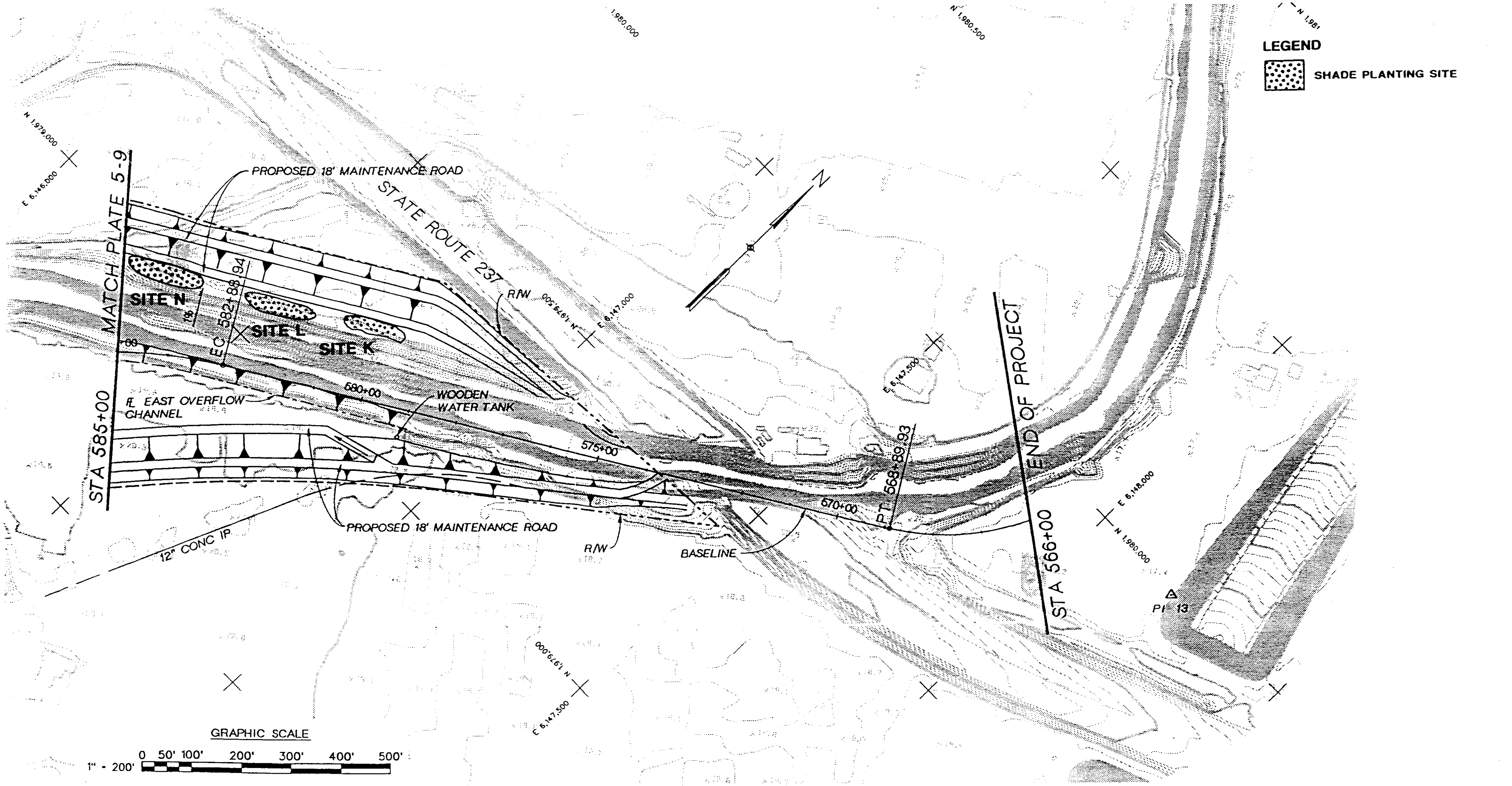
COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK
PLATE C-5

MITIGATION MEASURES

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

SFO31213.A1



BASELINE CONTROL								
PI	BEARING	DISTANCE	COORDINATES		CURVE DATA			
			NORTHING	EASTING	△	R	L	T
PI 12			1,978,331.55	6,145,565.05	96°55'18"	1000'	1691.60'	1128.74'
	N 57°57'33" E	3117.48'						
PI 13			1,979,985.45	6,148,207.64	99°24'52"	500'	867.55'	589.73'

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
~~COYOTE CREEK~~

PLATE C-6

MITIGATION MEASURES

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

APPENDIX D

FISHERIES MITIGATION AND MONITORING PROGRAM
COYOTE CREEK--REACH 3
SANTA CLARA, CALIFORNIA

Excerpted from Appendix E of the Final General Design Memorandum, Coyote and Berryessa Creeks, California, Coyote Creek, (GDM, 1993)

Contents

Page

1. **Incremental Cost Analysis of Fishery Mitigation Measures** D-1

2. **Fishery Evaluation Report Mitigation Measures** D-1
   - 2.1 Standish Dam D-1
   - 2.2 Channel and Bed Modifications D-3

3. **Incremental Cost of Analysis of Fisheries Mitigation** D-4
   - 3.1 Background and Purpose D-4
   - 3.2 Fishery and Aquatic Resources of Lower Coyote Creek D-5
   - 3.3 Impacts to Aquatic Habitats of Lower Coyote Creek D-6
   - 3.4 Mitigation Planning Objectives to Address Impacts to Aquatic Habitats of Lower Coyote Creek D-9
   - 3.5 Assessment and Cost of Fishery Mitigation Measures D-10
   - 3.6 Comparison of Mitigation Plans and Incremental Costs and Determination of the Recommended Mitigation Plan D-22

4. **References** D-22

Tables

Number

D-1 Relative Proportions and Values of Different Aquatic Habitat Types in Lower Coyote Creek D-8

D-2 Mitigation Objectives for Impacts to Fish Habitat To Be Caused by the Lower Coyote Creek Flood Control Project D-11

D-3 Costs of Associated Measures Addressing Fishery Mitigation Objectives for the Lower Coyote Creek Flood Control Project D-23

Figures

D-1 Plan Detail for Washington Baffles and High-Flow Baffles at State Route 237 .... D-15

D-2 Conceptual Design for Construction of Salmonid Spawning Riffle Habitat, with Buried Boulder Weirs for Hydraulic Control D-19

Appendix D
Fisheries Mitigation and Monitoring Program

1. Incremental Cost Analysis of Fishery Mitigation Measures

The Coyote Creek and Berryessa Creek Feasibility Report/Environmental Import Statement (FR/EIS) did not identify any direct impacts to fishery resources, and no mitigation measures were recommended. As a result of resource agency concerns, the Lower Coyote Creek Fisheries Evaluation Report was prepared in 1989 (John Stanley and Associates et al., 1989) for the Santa Clara Valley Water District (Water District); this report includes a re-evaluation of impacts to fisheries resources and describes proposed mitigation measures (see Section 6.3, Environmental Commitments, of the Final General Design Memorandum (GDM), U.S. Army Corps of Engineers, 1993). In order to perform an incremental cost analysis, fishery mitigation alternatives will be developed in consultation with the Corps, Water District, and the resource agencies. Once these alternatives have been identified, their relative costs will be analyzed using incremental cost analysis procedures.

2. Fishery Evaluation Report Mitigation Measures

The FR/EIS identified a mitigation objective to provide full compensation for fish and wildlife habitat losses. The FR/EIS concluded that no significant long-term adverse impacts would result from the project. No specific fishery mitigation measures were proposed.

In 1989, the Lower Coyote Creek Fisheries Evaluation Report (HRG, 1989) was prepared in response to permit conditions required by California Department of Fish and Game (CDFG) for a Streambed Alteration Agreement for Reaches 1 and 2 (III-204-88, March 24, 1988, amended May 23, 1988, and III-1421-88 dated June 28, 1989). It identified several impacts to fishery resources and described mitigation measures. The following summarizes the mitigation measures presented in the report.

2.1 Standish Dam

2.1.1 Impact 1 (Reach 1 and 2)

Loss of 1580 feet of seasonal freshwater lake habitat accessible to salmon and steelhead and suitable for steelhead rearing (1,290 feet due to dam relocation and 290 feet due to channel realignment). Increased salt water penetration upstream could damage riparian vegetation and reduce stream shading.

Mitigation Measure: The CDFG Streambed Alteration Agreement III-1421-88 called for the relocation of Standish Dam about 1,800 feet downstream of its original location by October 30, 1991. This recommendation was modified in the Fishery Evaluation Report to call for the replacement, by 4/22/92, of the dam 290 feet or more downstream of the original location instead of the proposed 1,290 feet upstream of the original location. It is recommended that the dam be relocated to a site 2,490 feet downstream of the proposed site. This new location will call for maintaining a lower water elevation (6.0 feet instead of 6.8 feet) in the lake due to the constraints of surrounding land at the recommended dam site. The dam must be designed to avoid tidal overtopping at heights up to 6.8 feet.

2.1.2 Impact 2 (Reach 1 and 2)

Recommended relocation of the dam combined with channel realignments causes net loss of 3,590 feet of tidal channels compared to proposed project.

Mitigation: Improve tidal action to 4,710 linear feet of dredged channels along the inside of the abandoned salt pond in Lower Coyote Slough. The levee section at the west end of the longer (3,200 foot) segment will be lowered an additional 2 feet to facilitate inundation from the slough. The net gain of 1,120 feet of tidal channel mitigates for temporary construction impacts and enhances the availability of this habitat type.

Status: To be verified with the Water District and CDFG.

2.1.3 Impact 3 (Reach 1, 2)

Blocking of upstream fish migration while dam is operational.

Mitigation Measure: The dam will be in operation only from May to October. (Current) coordinate timing with CDFG.

Status: Currently followed by the Water District in their operations.

2.1.4 Impact 4 (Reach 1, 2)

When dam is in place, flow may not be sufficiently concentrated to allow downstream passage of fish.

Mitigation Measure: The flow over Standish Dam will be concentrated to allow the downstream passage of fish. A surface spill weir, such as a V-notch weir and sluiceway/ tidegate, are recommended. A fish ladder was determined not to be required (April 22, 1992).

2.1.5 Impact 5 (Reaches 1-2)

Reduced stream shading results in increased water temperature too great to support summer rearing juvenile steelhead.

Mitigation: The existing main channel at the site of "Delta Islands" will be narrowed, and its slopes will be steepened to produce a cross-section similar to the existing lake upstream, improving the stream shading opportunity. Banks will be revegetated with willows on the lower bank and cottonwoods on the upper banks to speed the restoration of shade levels.

2.2 Channel and Bed Modifications

2.2.1 Impact 6 (Reach 3)

Loss of 250 feet of rocky riffle habitat.

Mitigation: Recreate 250 feet of rocky riffle habitat at the channel constriction at SR 237. Construct riffles in a manner similar to channel protection downstream of Coleman Avenue on the Guadalupe River, with anchored in-channel rip-rap and boulders.

2.2.2 Impact 7 (Reach 3)

Loss of near bank and emergent vegetative cover for fish.

Mitigation: Use large 2-foot diameter rip-rap as bank protection to provide cover.

2.2.3 Impact 8 (Reach 2, 3)

Impaired fish passage at SR 237.

Mitigation: Construct a Washington baffle system, approved by CDFG, in the low-flow channel to dissipate velocity, maintain adequate water depths, and allow for fish passage under low-flow conditions. Provision of baffles along the sides of concrete invert slopes will allow fish passage under high flows.

2.2.4 Impact 9 (Reach 3)

Loss of salmon and steelhead spawning riffles downstream of Montague Expressway and probable degradation/siltation of marginal spawning gravels downstream.

Mitigation: Reconstruct and enhance spawning riffles near the site of destruction. Replacement of gravels (1- to 3-inch diameter creek-run gravel) will be at a ratio of 2:1. The specific amounts and locations will be determined by the Water District fisheries consultant in consultation with CDFG prior to channel modification. Reconstructed riffles will be monitored to determine their effectiveness. Marginal spawning riffles downstream of Reach 3 will be monitored and replaced if siltation occurs. Future gravel reintroductions may be required.

2.2.5 Impact 10 (Reaches 2 and 3)

Reduced stream shading resulting in increased water temperatures too great to support summer rearing steelhead.

Mitigation: Plant riparian trees at selected sites with sparsely vegetated banks along Reaches 2 and 3. Proposed plantings of riparian trees next to existing vegetation mitigates vegetation and wildlife habitat losses but does not mitigate for loss of shade. Additional plantings are required in areas where riparian trees are already sparse and along realigned channels to mitigate for reduced stream shading:

- Riparian trees will be planted at selected locations in Reaches 2 and 3 (2,665 linear feet of bankside have been identified for planting [Appendix C and Plates C-1 through C-6]).
- Planting goals for Reach 2. Sufficient densities to increase shading to 19 percent, to mitigate for 2,095 linear feet of channel where mean shading will be reduced from 17 percent to 1 percent.
- In Reach 3, plantings will be at densities sufficient to increase shading to 28 percent, to mitigate for 2,450 linear feet of channel where mean shading will be reduced from 22 percent to 3 percent.
- Plantings along realigned channels and along sparsely vegetated pre-existing channel will probably be necessary to achieve the full mitigation objective.

2.2.6 Impact 11 (Reach 3)

Net loss of 270 linear feet of deep pool and run habitat.

Mitigation: Replace through enhancement of seasonal lake habitat by the addition of 270 feet (accomplished by locating dam 270 feet further downstream). Seasonal lake habitat is of a higher relative value to Coyote Creek fishery than pool and run habitat.

3. Incremental Cost of Analysis of Fisheries Mitigation

3.1 Background and Purpose

The FR/FEIS for the Lower Coyote Creek Flood Control Project, dated November 1987, included a mitigation plan and incremental cost analysis for addressing impacts to riparian habitat. However, the document was determined by the Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG) to inadequately address potential impacts to fishery and other aquatic resources of Coyote Creek. Based on these agencies' concerns, the local sponsor, the Water District, commissioned a reconnaissance-level fisheries investigation to re-evaluate potential project impacts on fish and aquatic resources (John Stanley and Associates *et al.*, 1989). Results from the fisheries investigation led to development of specific aquatic habitat mitigation measures to compensate for impacts to be incurred from the implementation of the Recommended Plan: "Alternate Sides Overflow Channel with Offset Levees Plan." The reviewing agencies have indicated support of the fishery mitigation plan as described in the Water District's "Lower Coyote Creek Fisheries Evaluation Report," dated March 6, 1989, provided adequate post-project monitoring of mitigation performance and contingency measures are included in the final fishery mitigation plans.

The purpose of this section is to document the examination of fishery mitigation measures to determine a least-cost fishery mitigation plan for co-implementation with a flood control project for lower Coyote Creek. The guidelines presented in EC 1105-2-185 (U.S. Army Corps of Engineers), "Fish and Wildlife Mitigation Planning: Incremental (Marginal) Cost Analysis-March 1988," were followed, where applicable, in preparing this section.

For the purpose of this section, the following definitions are consistent with guidelines in EC 1105-2-185: (1) Mitigation objectives entail provisions for fish passage and replaced habitat values, (2) A mitigation plan increment is a single functionally independent fishery mitigation measure, and (3) A mitigation plan is a combination of increments that provide for achieving the overall mitigation objectives.

3.2 Fishery and Aquatic Resources of Lower Coyote Creek

The fish habitat of lower Coyote Creek has been substantially degraded by past and present land use and watershed management activities in the Santa Clara Valley; however, the stream continues to support a complement of non-native and native fish species. The Lower Coyote Creek Fisheries Evaluation Report provides a description of the fish species composition, an assessment of aquatic habitat condition, and a reconnaissance-level evaluation of habitat utilization by fish. Of significance was the discovery, during habitat surveys in 1987, of evidence of salmon spawning (*i.e.* redds, or salmon nests) in Reach 3 of the proposed project. In subsequent years, adult chinook salmon (*Oncorhynchus tshawytscha*) have been observed in the creek within the city of San Jose (Dr. Jerry Smith, personal communication). While steelhead (*Oncorhynchus mykiss*) have been known to use Coyote Creek and its upstream tributaries as spawning and rearing habitat for many years, the fisheries evaluation also determined that they utilize the proposed project reaches as rearing habitat and potentially for spawning as well. The FR/FEIS recognized the very high regional value of the riparian corridor of lower Coyote Creek as it ". . . is one of only a few such naturally occurring areas remaining in the region." The presence of steelhead, and recent observations of potential chinook salmon spawning, further illustrate the regional significance of the riparian/aquatic habitat of lower Coyote Creek, since only a few other tributaries to south San Francisco Bay continue to support small runs of these fishes (Leidy 1984). The USFWS designated the Coyote Creek riparian habitat as Resource Category 2, with the attendant goal of no net loss of habitat from project implementation. In addition, the State of California enacted the "Salmon, Steelhead Trout, and Anadromous Fisheries Program Act" in 1988, which provides that, "It is the policy of the state that existing natural salmon and steelhead trout habitat shall not be diminished further without offsetting the impacts of the lost habitat" (California Fish and Game Code (CFGC), subsections 6900-6924). Further, it is state policy to give preference to fishery management measures that protect, improve, or increase the natural production of anadromous salmonids over management measures to mitigate with artificially propagated fish (CFGC, Subsection 6901).

3.3 Impacts to Aquatic Habitats of Lower Coyote Creek

Because of a lack of quantitative data on fish production and limited data on fish habitat relationships for the fish species of concern inhabiting lower Coyote Creek, a standardized unit of habitat quality relating each of the impacted habitat features to fish production could not be utilized for this analysis. Instead, it was appropriate to examine physical habitat impacts (i.e., net losses and deleterious physical alterations of habitat). The impacts of a bypass channel flood control project for lower Coyote Creek on fish habitat features can be placed into three categories: (1) fish passage impacts, (2) losses of instream habitat, and (3) losses or reduction of stream shading provided by riparian vegetation. Detailed descriptions of the impacts to fish habitat associated with implementation of the Recommended Plan are provided in the Fisheries Evaluation Report. The impacts to, and net losses of, fish habitat are summarized below.

3.3.1 Fish Passage

- Placement and operation of a seasonal dam near Old Milpitas Pumping Station will impede downstream migrant salmonids during the spring and summer seasons and upstream migrants during the fall season (Transition between Reaches 1 and 2).

- Construction of a 690-foot-long concrete invert at the SR 237 bridge crossing will impede upstream migrant salmonids, especially during low flows and potentially during high flows. It will also impede downstream migrant salmonids during extremely low spring or summer flows (Transition between Reaches 2 and 3).

3.3.2 Instream Habitat

- Net loss of between 1,100 and 3,590 linear feet of tidal creek channel in Reach 1, depending on the final location of seasonal dam replacement (location and design as yet to be decided).

- Loss of 290 linear feet of seasonal (spring, summer, fall) lake habitat (Reach 2).

- Loss of 725 linear feet of sparse, emergent, and overhanging near-water-surface vegetative cover utilized by fish (Reach 3 overflow channel cross-over points and bank revetment areas near bridge crossings). Overall, implementation of the proposed project will eliminate the need for clearing vegetation in the natural creek channel, resulting in improved nearshore cover conditions throughout the project reaches compared to existing conditions.

- Net loss of 270 linear feet of deep pool and run habitat. This results from channel realignment (Station 590-594) which will convert approximately 900 lineal feet of pool/run habitat to 630 lineal feet of rocky run/riffle habitat, for which no mitigation is necessary since the conversion is to a higher value habitat (Reach 3).

- Loss of 250 linear feet of low-gradient rocky riffle at SR 237 due to channel lining.

- Replacement of approximately 300 linear feet of combined pool-run (80 percent) and salmonid spawning riffle (20 percent) habitats with rock-lined channel immediately downstream from the Montague Expressway crossing (Reach 3).

- Potential siltation (loss) of about 30 linear feet of spawning riffle downstream from the channel realignment to be constructed between stations 590-594 (Reach 3).

The values of each of the habitat types comprised by lower Coyote Creek differ in importance to, and utilization by, fishes inhabiting the creek. The relative qualitative values of each of the primary habitat types were discussed in the Fisheries Evaluation Report and are compared in Table D-1.

Important to this analysis is the fact that riffle habitat in Reach 3 was: (1) the most utilized habitat by stream fishes and the least abundant (comprising only 13 percent of available habitat), and (2) utilized for spawning by salmon and/or steelhead. Therefore, impacts to riffle habitat are considered a greater detriment to fish resources than are impacts to other habitat types in Reach 3.

3.3.3 Stream Shading

- Reduction of overall stream shading in Reach 2 from a mean of 19 percent to 16 percent. This results from reductions in mean shading from 17 percent to 1 percent along 2,095 linear feet of channel at bypass channel crossovers and channel realignments (approximately 1.4 acres of nearshore riparian vegetation, assuming that effective shading is provided by a riparian width of 30 feet).

Table D-1
Relative Proportions and Values of Different Aquatic Habitat Types in Lower Coyote Creek

	Reach 1		**Reach 2**[a]		**Reach 3**	
	%	**Rank Order of Importance**[b]	**%**	**Rank Order of Importance**[b]	**%**	**Rank Order of Importance**[b]
Pool/Run	0%	▨	0%	▨	87%	2
Riffle	0%	▨	0%	▨	13%	1
Seasonal Lake	0%	▨	100%	1	0%	▨
Tidal Channel	100%	1	0%	▨	0%	▨

[a] Reach 2 alternates seasonally between tidal creek habitat in the fall and winter months and freshwater lake habitat in the spring and summer. Its greatest value to the fishery is as lake habitat for steelhead rearing during the spring and summer months.

[b] The relative order of importance of each habitat type is indicated numerically, with the number one designating the highest value habitat and successive numbers designating incrementally lesser value habitats. Habitat types with the same ranking are of approximately equal importance to the fish community of lower Coyote Creek.

Source: John Stanley and Associates *et al.* (1989)

- Reduction of overall stream shading in Reach 3 from a mean of 28 percent to 25 percent. This results from reductions in mean shading from 22 percent to 3 percent along 2450 linear feet of channel at bypass channel crossovers, channel realignments, and bridge crossing bank revetment sites (approximately 1.7 acres of nearshore riparian vegetation, assuming that effective shading is provided by a riparian width of 30 feet; however, recent changes in Reach 3 levee alignment may require this estimate to be amended).

3.4 Mitigation Planning Objectives to Address Impacts to Aquatic Habitats of Lower Coyote Creek

The overall mitigation goal for the project, as stated in the FR/FEIS, is full (100 percent) compensation of habitat losses to fish and wildlife species dependent upon the riparian corridor of lower Coyote Creek. Specific onsite fish habitat mitigation objectives for the proposed project that have been defined by reviewing agencies and the Water District are described below.

3.4.1 Fish Passage

- Provide for effective upstream and downstream fish passage at the seasonal dam located in Reach 1.
- Provide for effective upstream and downstream fish passage at the proposed concrete invert at the SR 237 bridge.

The overall success of a fish habitat mitigation plan for the recommended flood control project is contingent on the provision of effective upstream and downstream fish passage at project features that could impede fish migration and thus prevent unrestricted and full utilization of preserved or restored habitats. Mitigation measures employed to achieve these objectives must be considered integral to measures for mitigating instream habitat impacts.

3.4.2 Instream Habitat

- Prevent and/or replace losses of tidal channel fish habitat, freshwater lake salmonid rearing habitat, salmonid spawning riffles, low-gradient riffle habitats, and emergent and overhanging vegetative cover in the project reaches.

The direct impacts to fish habitat that will result from the implementation of the recommended flood control plan can be mitigated: (1) through avoidance of impacts altogether, or (2) through reconstruction of habitat at site of impact, or (3) through onsite replacement of impacted habitat with habitat of higher value to the fishery, or 4) through replacement with habitat of similar or higher value at another appropriate site within the project reach. Table D-2 displays the mitigation objectives for each impacted fish habitat type in Reaches 1-3.

3.4.3 Stream Shading

- Prevent declines of, and/or restore, pre-project stream shading levels along Reach 2 and Reach 3.

Barring mitigation measures which avoid impacts to stream shading riparian vegetation, it would be necessary in Reach 2, to provide for the lost equivalent of a 17 percent mean shading level along 2,095 lineal feet of channel, or approximately 1.4 acres of nearshore riparian vegetation planted to an appropriate density. Similarly, in Reach 3, it would be necessary to provide for the lost equivalent of a 22 percent mean shading level along 2,450 linear feet of channel, or approximately 1.7 acres of nearshore riparian vegetation planted to an appropriate density. The actual acreage and planting densities necessary will need to be established through onsite monitoring. (Some recovery of lost shading will accrue from increased nearshore plant growth due to cessation of routine channel clearing with construction of the flood control project; however, the actual contribution toward mitigation of lost shading is not known).

3.4.4 Mitigation Monitoring

- Provide for monitoring the performance of all of the above mitigation measures.

This mitigation objective is required by the reviewing agencies. It will need to be implemented regardless of the mitigation plan finally selected and its cost will be essentially the same in any case; therefore, it is not subject to incremental analysis.

3.5 Assessment and Cost of Fishery Mitigation Measures

The Fisheries Evaluation Report explored offsite mitigation options within the Coyote Creek drainage, such as providing fish access (passage) to better salmonid spawning and rearing habitat upstream of existing Water District reservoirs, to compensate for losses of similar habitat that would be caused by the flood control project. However, because of technical constraints of water management operations on Coyote Creek at the present time, no actions, including improved streamflows from upstream dams, could be identified in the upper watershed that would assure improved conditions for salmonid spawning and rearing. In addition, mitigation policies of the U.S. Army Corps of Engineers and the USFWS prefer the use of onsite lands over offsite lands for mitigation purposes wherever practical. Therefore, the best possible set of mitigation actions for impacts to lower Coyote Creek fish habitat will have to be implemented within the project area. Options for mitigating project impacts to fish habitat are limited to measures that can be effectively applied within

Table D-2
Mitigation Objectives for Impacts To Fish Habitat To Be Caused by the Lower Coyote Creek Flood Control Project

Reach	Habitat Type	Impact/Modification	Mitigation objective
1	Tidal channel	Loss of 1,100 to 3,590 linear feet (depending on dam relocation)	In-kind replacement
2	Seasonal lake	Loss of 290 linear feet	In-kind replacement
3	Pool/run	Net loss of 270 linear feet	In-kind replacement or replacement with habitat of higher value to fishery
3	Low gradient rocky riffle	Loss of 250 linear feet at Highway 237 crossing	In-kind replacement
3	Spawning riffle (20%), pool/run (80%) combination	Loss of 300 linear feet at Montague Expressway crossing	Replacement/enhancement of riffle at 2:1 gravel volume ratio and in-kind replacement of pool/run or replacement with higher value habitat
3	Spawning riffle	Potential siltation of approximately 30 linear feet downstream of channel realignment	Abatement of siltation, monitoring, and potential replacement of riffle at 2:1 gravel volume enhancement
3	Nearshore, overhanging, or emergent vegetative cover	Loss of 725 linear feet due to bank revetment	Avoidance or replacement with equivalent cover value. Proposed project will eliminate regular clearing of channel vegetation, improving overall instream cover conditions compared to existing conditions without a flood control project

Sources: John Stanley and Associates *et al.* (1989), and Reviewing Agency Comments the project reaches of the creek. Avoidance of impacts and onsite replacement/ enhancement of impacted habitats are the two most viable mitigation strategies based on recommendations of the reviewing agencies and the Water District's fishery investigation.

Two major alternatives, one pursuing each mitigation strategy, have been identified:

- Implementation of the "Same Side Overflow Channel And Offset Levees Plan", which avoids impacts to: (a) nearshore and emergent vegetative cover (Reach 3), (b) 30 linear feet of potential salmonid spawning riffle (Reach 3), and (c) approximately 1.8 acres of shade-casting nearshore riparian vegetation.

- Implementation of the "Alternate Sides Overflow Channel And Offset Levees Plan" with onsite replacement/enhancement necessary for all fish passage and habitat impacts described in Section 3.3.

Both alternative strategies consist of the same mitigation plan increments to address the two fish passage objectives, and the following fish habitat replacement objectives: tidal creek channel (Reach 1), seasonal lake (Reach 2), pool/run (Reach 3), rocky riffle and spawning riffle habitats near the bridge crossings at SR 237 and Montague Expressway, and compensation for losses of 1.3 acres of shade-casting riparian vegetation in Reaches 2 and 3. The plans differ in the mitigation plan increments addressing: replacement/protection of nearshore and emergent vegetative cover (Reach 3), replacement/protection of impacts to 30 linear feet of salmonid spawning riffle (Reach 3), and replacement/protection of 59 percent (or 1.8 acres) of the potentially impacted shade-casting riparian vegetation (Reaches 2 and 3).

All reported costs are approximate construction costs unless otherwise stated. Additional costs associated with engineering and design, supervision and administration, and operation and maintenance could not be determined at this time but are assumed to be proportional to construction costs and are included in the final GDM.

3.5.1 Measures Common To Both Alternative Mitigation Strategies

The following paragraphs provide brief descriptions for each of the mitigation increments that are the same for addressing the objectives in each of the alternative mitigation plans: (1) Upstream and downstream fish passage at the ultimate Standish Dam site (one increment) and at the SR 237 concrete invert (one increment); (2) Replacement of tidal creek channel (one increment); (3) Replacement of seasonal lake (one increment); (4) Replacement of pool/run (one increment); (5) Replacement of rocky riffles (two increments); and (6) Replacement/enhancement of salmonid spawning riffles (two increments).

3.5.5.1 Fish Passage.

a. ***Standish Dam Mitigation (One Increment).*** While decisions regarding the final design and relocation of the Standish Dam in Reach 1 have yet to be made, it is assumed that a flashboard type dam will be reconstructed. This dam is used seasonally during the spring, summer, and early fall months. Upstream fish passage concerns can be addressed as in the past by removing the dam during the fall and winter months, providing unimpeded fish passage during the primary period of upstream spawning migrations for the anadromous fishes of concern. The timing of this practice will be coordinated with the CDFG. There would be no direct project-related costs associated with this practice.

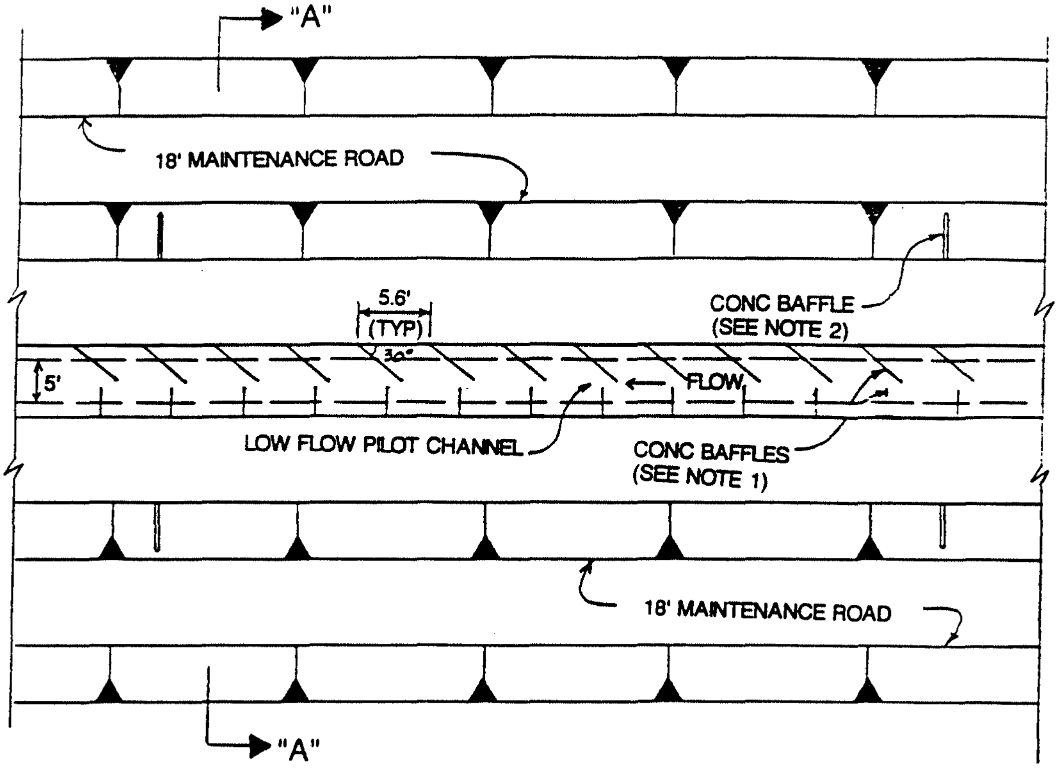
   Downstream fish passage at the ultimate Standish Dam site is of some concern during the late spring months and may be addressed by providing a surface spilling weir and removable sluiceway and tidegate. This configuration would allow downstream migrants to pass the dam and prevent salt-water intrusion during the highest tides, since the approximate dam location will be in Reach 1, where tidal height may exceed the required impounded freshwater surface elevation. Design criteria will be determined in consultation with the CDFG. In general, the weir should be capable of passing a range of summertime stream flows varying from <1 cfs to about 20 cfs. The minimum depth on the weir crest should not be less than 5 or 6 inches at the lowest determined flows when fish are expected to pass (approximately 0.5 cfs). The sluiceway will drop (≤6 percent slope) and discharge to a level not to exceed 1 foot above mean low water in the downstream channel. Discharge onto the concrete foundation of the dam must be avoided to prevent injury to the fish. The costs associated with providing this measure will be limited to the engineering and design of the spill weir and sluiceway, since the dam itself is not a fishery mitigation measure. A preliminary estimate for the cost of this dam is $5,570, and engineering and design associated costs will be 15 percent ($836) of this cost. The Water District is presently preparing a design for this dam.

b. ***SR 237 Mitigation (One Increment).*** Two alternative mitigation concepts were considered for alleviating fish passage problems at the SR 237 bridge crossing. The first consisted of widening and lining the channel invert with appropriately sized rock. A rock-lined channel has fish passage benefits over a concrete-lined channel. Rock lining provides a heterogeneous channel matrix which, at high stream flows, creates a slowed boundary layer near the bottom, through which fish can swim. A concrete-lined channel does not provide a boundary layer of sufficient depth that fish can use to pass through an area of very high flows. At low flows, a properly designed rock-lined channel can effectively allow fish passage. Despite the fish passage advantages provided by a rock-lined channel, it was determined by hydraulic analysis to be technically infeasible for this location because of the high flood flows that must be passed beneath the SR 237 bridge.

The alternate fish passage mitigation considered for this area was stipulated by the reviewing agencies as the appropriate mitigation measure. It consists of installing Washington Baffles in the low-flow pilot channel along the 690-foot length of the concrete channel lining. This baffle arrangement described by McKinley and Webb (1956) is shown in a typical plan drawing in Figure D-1. The adequacy of this design was confirmed by comparing the expected hydraulic conditions at this site with specific fish passage criteria provided by the CDFG.

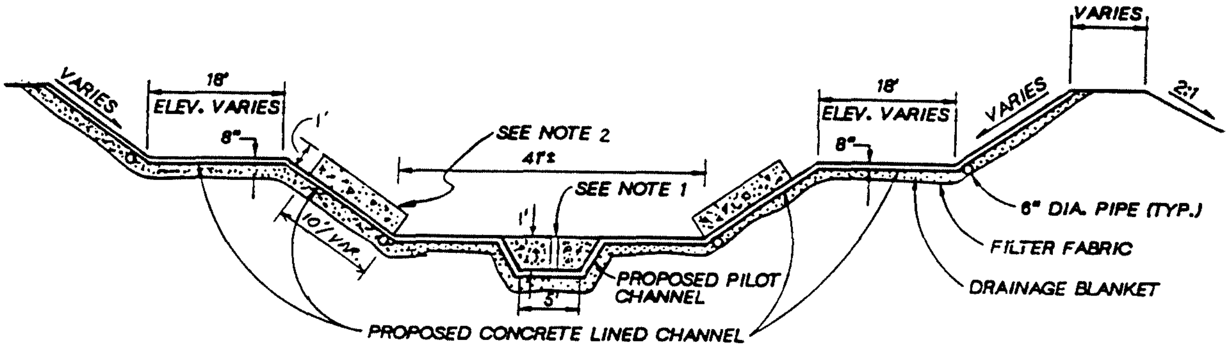
The annual 95-percentile (high-flow passage criterion) and 50-percentile (low-flow passage criterion) flows were estimated from the design hydrograph for specific recurrence interval floods and from field measurements of low-flow velocities, as no daily stream flow information for lower Coyote Creek was available. At the projected annual 95-percentile flow, 60 cfs, a velocity of 3.2 to 3.8 feet per second, could be expected over the concrete invert. At the projected annual 50-percentile flow, 10 cfs, 3.5 to 4.0 feet per second, is the expected velocity. These projected water velocities assume a channel slope ranging from ≤0.25 percent to about 0.50 percent. From these calculations, it was determined that the low-flow channel will provide adequate water depths (≥1 foot) and hydraulic conditions (resting pool intervals) for fish passage at the median annual or 50-percentile flow (approximate summer low flow). While the baffling in the low-flow channel will provide some degree of adequate fish passage conditions when inundated at higher flows (from the 50- to the 95-percentile flow level), it will be necessary to provide baffling along the side slopes of the trapezoidal invert to ensure compliance with the requirement to fully provide for fish passage up to the annual 95-percentile flow. This can be accomplished by providing baffles 1 foot high by approximately 10 feet long along the trapezoidal sides of the concrete invert adjoining the angle with the bottom of the channel. With an expected water velocity at the 95-percentile flow of approximately 4 feet per second, baffles spaced at about 150-foot intervals along both sides of the invert will provide sufficient resting locations for steelhead and salmon (criteria provided by the CDFG's "Alaska Curve" relationship for water velocity and resting pool interval). The estimated cost for the baffled low-flow channel and side slope baffling, integrated into the 690-foot-long concrete invert, is $14,828.

3.5.1.2 Replacement of Tidal Creek Channel (one increment). The losses of tidal creek habitat are due to channel realignment in Reach 1 and the final decision regarding the relocation of the Standish Dam. Regardless of the relocation of the dam, an opportunity to mitigate for the total loss because of channel realignment and provide for some enhancement of tidal channel habitat was identified. This measure requires breaching old levees around the former Leslie Salt evaporation ponds acquired for the construction of the



PLAN VIEW - HIGHWAY 237 CONC CHANNEL

NOT TO SCALE



SECTION "A-A"

NOT TO SCALE

NOTES:

1. 246 CONC BAFFLES SPACED AT APPROX 5.6' INTERVAL - 123 W/ DIMENSIONS (4.75'Lx0.5'Wx1'H) AND 123 W/ DIMENSIONS (1.9'Lx0.5'Wx1'H).
2. 8 CONC BAFFLES SPACED AS SHOWN ON THE PLAN - EACH WITH DIMENSIONS (10' & VARIES Lx0.5'Wx1'H).

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE D-1
PLAN DETAIL FOR WASHINGTON BAFFLES AND HIGH-FLOW BAFFLES AT STATE HIGHWAY 237

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

Reach 1 floodway bypass. This measure provides for 4,710 linear feet of tidally influenced channel, which includes 1,120 to 3,610 lineal feet of tidal channel enhancement, depending on the final location of Standish Dam. It is compatible with designed flood conveyance and other project mitigation objectives for salt marsh and waterfowl habitat. The cost for cutting 30-foot-wide breaks in these levees (8 feet deep by 20 feet wide on top with a 1:1 slope) was estimated at $1,350 per excavation. John Stanley and Associates *et al.* (1989) estimated that five breaks would be necessary to provide sufficient tidal action to these channels. Five excavated levee breaks would cost $6,750.

3.5.1.3 Replacement of Seasonal Lake (Steelhead Rearing Habitat) (one increment). The primary fishery value of the seasonal lake is its simulation of coastal lagoon steelhead-rearing habitat. It is one of the most important fish habitats within the project reaches. The replacement of the seasonal dam at a downstream location within Reach 1, which compensates for the net loss of 290 linear feet of habitat, can be accomplished at no cost to the project. In addition, because of the net gain in tidal creek channel habitat possible through implementation of the previously described mitigation measure, further enhancement of this important seasonal lake habitat could be accomplished by moving the location of the dam still farther downstream in the reach, again at no cost to the project. John Stanley and Associates *et al.* (1989) recommended that the Standish Dam's final location be moved to a point 2,490 feet downstream from the proposed project location to compensate for in-kind habitat losses and losses of less valuable upstream habitats (*i.e.*, pool and run habitats) and to enhance the availability of this valuable steelhead-rearing habitat. This action would provide a net enhancement of 3,610 lineal feet of seasonal lake at no additional cost to the project.

3.5.1.4 Replacement of Pool and Run Habitat (One Increment). Because of the abundance and relatively low habitat value of pool and run habitat for fishes of lower Coyote Creek, replacement of the net loss of 270 linear feet of this habitat in Reach 3 with an equivalent 270 linear feet of the higher value seasonal lake habitat in Reach 1 can be accomplished at no cost to the project as described in the preceding paragraph. Total cost of this increment: $0.

3.5.1.5 Replacement of Rocky Riffle Habitat (Two Increments). In-kind replacement of the 250 linear feet of rocky riffle to be lost at the Highway 237 transition is the mitigation objective for this high-value habitat. This objective can be accomplished near the site of impact, upstream and downstream of the proposed concrete channel transition invert. Since channel stabilization will be necessary upstream and downstream of the concrete invert, integration of features that will create a rocky riffle habitat will be compatible with this purpose. The total habitat replacement quantity can be split between the upstream (125 feet) and downstream (125 feet) ends of the concrete invert. Two approaches to constructing this habitat can be described by two increments with differing unit costs. The first requirement of both approaches is to grade the channel to a 1 percent to 3 percent slope along the length of the riffle area. Boulders 1 to 2 feet in diameter should be placed in semi-random patterns at densities not to exceed 3 boulders per square yard throughout the riffle area. The boulders may be anchored in place by either of two methods compatible with other channel stabilization features: grouting boulders in place ($27,315 per 100 lineal feet - 30-foot channel width); or anchoring each boulder through a drilled hole with reinforcing steel ($12,744 per 100 lineal feet - 30-foot channel width). In both increments, spaces between boulders can be backfilled with smaller armoring. The total cost of each increment for meeting the full objective of 250 lineal feet of riffle is $68,288 or $31,860. Thus, anchoring boulders with reinforcing steel would be the most cost-effective approach to providing the necessary rocky riffle habitat.

3.5.1.6 Replacement of Salmonid Spawning Riffles (and Associated Pool/Run) (Two Increments). The conversion of combined pool/run and spawning riffle habitats immediately downstream from the Montague Expressway to rock-lined channel can be mitigated through the enhanced replacement of the riffle habitat (approximately 900 square feet in total in 2 riffles - this needs field verification - Dr. Jerry Smith, CSU-San Jose, personal communication). The conversion of pool/run habitat (approximately 240 linear feet) to rock-lined channel can be considered as replacement with a higher value rocky riffle or run habitat, which is the habitat expected to be created at this project feature. Full mitigation for lost spawning habitat at this site has been recommended at a spawning gravel replacement ratio of 2:1 and can be accomplished through two approaches defined by two differing unit costs, or increments. The depths of spawning gravels on the impacted riffles have been described as shallow, generally ≤1 foot (Dr. Jerry Smith, CSU-San Jose, personal communication). Given this gravel depth, and the assumed total habitat area involved, approximately 900 cubic feet of spawning gravels need to be replaced and enhanced at a 2:1 ratio, or about 1,800 cubic feet of gravel needs to be placed and maintained in adequate condition for use by spawning salmonids.

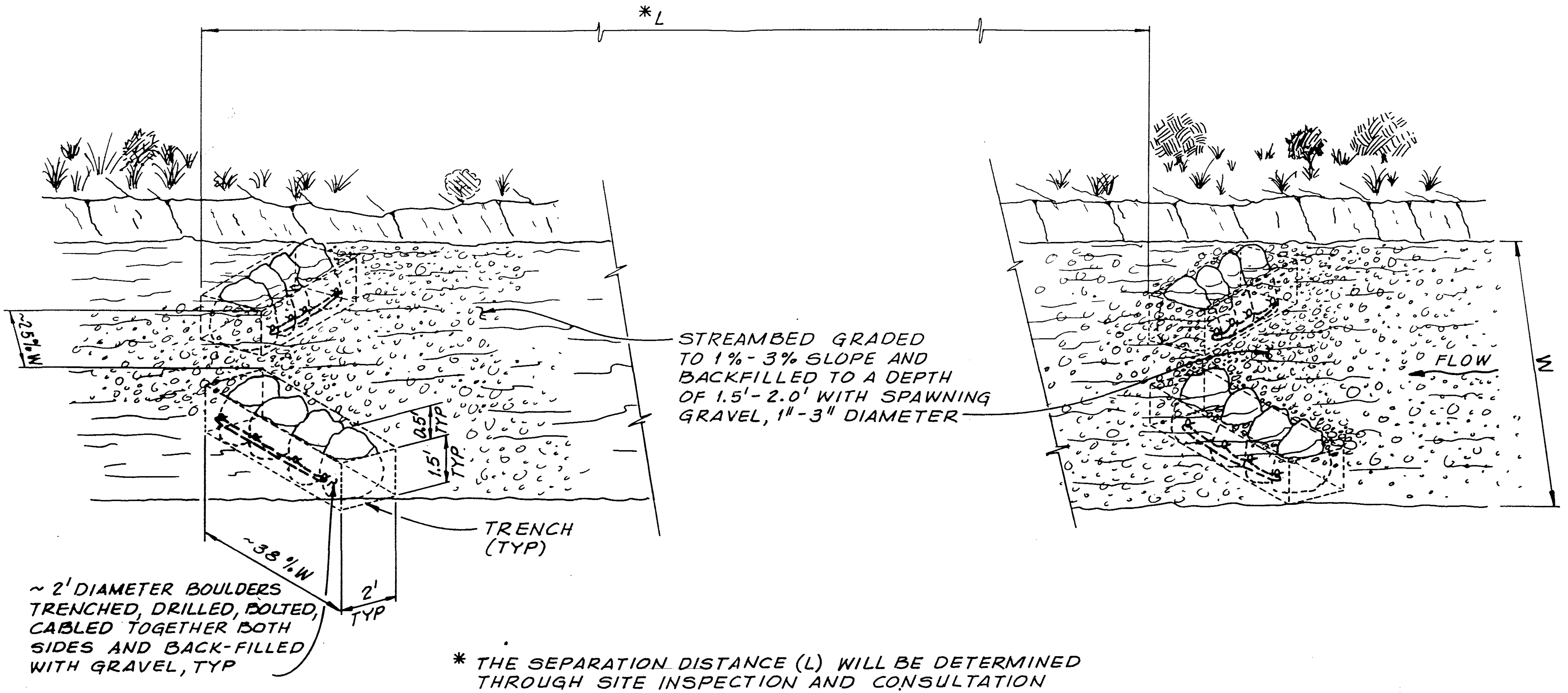
The first approach, and cost increment, to spawning gravel replacement is to identify sites with specific hydraulic conditions adequate for salmonid spawning and place and spread gravels at an optimum depth of 1.5 to 2-feet. Individual sites should be no smaller than about 60 square feet to accommodate the area required for salmon redd construction. Ideally, selected areas should be no smaller than 100 square feet in order to provide sufficient area to attract and accommodate spawning salmon. If a sufficient number of appropriate sites is not available where the entire quantity of gravel can be placed in the creek, placement of the remaining gravel along the toe of strategically located banks where high creek flows will naturally distribute the gravel can be pursued. Gravel composition should be primarily (>95 percent) 1- to 3-inch diameter creek run gravel. The inclusion of 25 percent natural "white gravel" will allow post-placement monitoring of gravel movement after high flows. Maintenance costs related to regular gravel replenishment, at a frequency and volume to be determined by annual monitoring, may be incurred with this increment, but specific maintenance-related costs cannot be fully determined at this time. Costs for enhanced replacement of spawning gravels using this approach will be essentially the same at any location within the project reach and will include: gravel acquisition and hauling for local creek run and non-native "white gravels," site preparation, and gravel spreading with hand crews and small rubber-tired backhoes. The cost of this increment is approximately $160 per 100 cubic feet or $2,900 for the full 2:1 spawning gravel replacement.

The second approach, or cost increment, to replacing these spawning gravels includes the same costs for the replacement gravel mixture described above. In addition, it includes measures to maintain optimal hydraulic conditions at the site of placement and to improve the retention of gravels at the site of placement, and therefore lower expected gravel replenishment and maintenance costs. The additional measures comprised by this increment include grading the streambed to a 1 to 3 percent slope along the length of the reconstructed riffle and constructing boulder weir structures at the upstream and downstream ends of the riffle (Figure E-2). Ideally, two riffles of 450 square feet each, with spawning gravels backfilled to approximately 2 feet deep, would be constructed at locations to be determined in the field in consultation with CDFG. The costs for these measures are the same regardless of the location of placement in the project reach. The cost for each riffle includes gravel costs as described above, site preparation and grading, and weir construction and totals approximately $2,800, or $5,600 for the full 2:1 spawning gravel replacement objective.

A derivative of the second approach might allow for the integration of spawning riffle replacement along portions of the rock-lined channel proposed for downstream of Montague Expressway. Such placement could take advantage of the grading requirements and revetment rock placement already necessary at this site, thus reducing the overall cost of implementing this measure. In addition, such placement would be near the pre-project location of the riffles. Boulder weirs could be integrated into the channel lining design and gravels overlayed on the intervening rock armoring to a depth of 2 feet. Two riffle sites of 450 square feet each constructed in this manner will provide for the full 2:1 spawning gravel replacement objective of 1,800 cubic feet of spawning gravels at a cost that is probably similar to the $2,900 gravel-spreading increment previously described, but with potentially lower long-term maintenance and gravel replenishment costs.

3.5.1.7 Replacement of Shade-Casting Riparian Vegetation in Reaches 2 and 3 (One Increment for 1.3 acres Total). Replacement of shade-casting riparian vegetation to compensate for project-related losses of this aquatic habitat feature is assumed, for purposes of this analysis, to have the same unit cost for implementation anywhere along Reaches 2 and 3, since all such planting will be on project lands immediately adjacent to the creek. The primary shade-casting plant species in both reaches are cottonwood and willow. It is also assumed for purposes of this analysis that planting composition, primarily cottonwood on the upper banks and willow on the lower banks, and planting densities will be similar to the densities used for stream shade plantings presently being implemented along Reach 2 by the Water District (John Stanley and Associates, Inc., December 1990).

Since opportunities for re-establishment of shade-casting vegetation at sites of removal will be limited to streambanks along channel realignments, compensation for vegetation removal at bypass channel crossovers and bridge crossing transitions will require mitigation through the enhancement of the remaining unimpacted riparian forest to achieve stream shading objectives. For purposes of this mitigation increment, it is assumed that stream shading objectives can be achieved by planting appropriate riparian vegetation at selected sites on project lands along the stream in Reaches 2 and 3 (totaling 1.3 acres) at densities similar to


*L
~25% W
STREAMBED GRADED TO 1% - 3% SLOPE AND BACKFILLED TO A DEPTH OF 1.5' - 2.0' WITH SPAWNING GRAVEL, 1" - 3" DIAMETER
0.5' TYP
1.5' TYP
TRENCH (TYP)
~38% W
2' TYP
~ 2' DIAMETER BOULDERS TRENCHED, DRILLED, BOLTED, CABLED TOGETHER BOTH SIDES AND BACK-FILLED WITH GRAVEL, TYP
FLOW
W

* THE SEPARATION DISTANCE (L) WILL BE DETERMINED THROUGH SITE INSPECTION AND CONSULTATION WITH THE CALIFORNIA DEPT. OF FISH AND GAME, AND BY ENGINEERING ANALYSIS TO PROVIDE OPTIMAL HYDRAULIC CONDITIONS FOR SALMONID SPAWNING AND GRAVEL RETENTION.

COYOTE AND BERRYESSA CREEKS, CALIFORNIA
COYOTE CREEK

FIGURE D-2
CONCEPTUAL DESIGN FOR CONSTRUCTION OF SALMONID SPAWNING RIFFLE HABITAT, WITH BURIED BOULDER WEIRS FOR HYDRAULIC CONTROL

CH2M HILL

SACRAMENTO DISTRICT
CORPS OF ENGINEERS
1993

those presently being used in Reach 2 by the Water District. In practice, 1.3 acres may not be a realistic objective, since this much plantable area may not be available along the creek. Approximately 1.27 acres of sparsely wooded riparian area in Reach 2 and 0.44 acres in Reach 3 have been identified to date for planting to meet this objective. Only through an ongoing process of monitoring shade levels and adjusting planting locations and densities will this overall stream shading objective be achieved. In this case, the 1.3-acre replanting objective serves as an approximation for determining the cost associated with this objective. Unit costs for the present shade-casting riparian plantings along Reach 2 are $21,875 per acre (this cost is for full planting in presently cleared areas). The cost for enhancement planting at undisturbed sites will probably be less since fewer plantings will be necessary, so this unit cost represents an upper limit cost for enhancement plantings. The total upper limit cost for fulfilling the 1.3 acre goal of this increment is $28,438. (Includes only planting costs; no associated irrigation or maintenance costs were available from the Water District.)

3.5.2 Same-Side Overflow Channel Plan: Incremental Costs of Avoiding Aquatic Habitat Impacts

This plan has an avoidance mitigation increment covering the protection of nearshore vegetative cover (Reach 3), 30 linear feet of spawning riffle (Reach 3), and 59 percent, or 1.8 acres, of the 3.1 acres total shade-casting riparian vegetation in Reaches 2 and 3. This flood control plan was described as an alternative to the recommended Alternative-Sides Overflow Channel Plan in the FR/FEIS. It avoids impacts to the three aquatic habitat features by eliminating the need for floodway bypass channel crossovers, except at the SR 237 crossing channel transition. The cost of avoiding impacts to these three aquatic habitat features is the difference in costs between the two flood control plans. Using the total project investment costs for the 100-year designs for the two plans presented in the FR/FEIS, and adjusting for the 9 percent cost growth between 1986 and 1991 (Engineering News and Review Cost Index), the overall cost for this avoidance increment is $20.2 million. If this cost is divided uniformly over each of the avoided habitat impacts, then the incremental cost of each of these, when considered as a separate mitigation objective, is $6.7 million.

3.5.3 Alternate-Sides Overflow Channel Plan: Additional Mitigation Increments

This plan addresses the mitigation objectives for the impacts to nearshore vegetative cover (Reach 3), 30 linear feet of spawning riffle (Reach 3), and the additional 1.8 acres of shade-casting riparian vegetation through onsite replacement/enhancement.

3.5.3.1 Replacement of Nearshore Emergent Vegetation (Fish Cover Habitat) (725 Linear feet, One Increment). Loss of this aquatic habitat feature is due to bank revetment and channel realignment in Reach 3. An equivalent nearshore cover functional value can be provided by large boulder bank revetment (approximately 2-foot diameter boulders). The use of 2-foot diameter rock at all bank revetment sites in Reach 3 will achieve this mitigation objective. The added cost of revetment for this mitigation increment is $3,000 per 100 square yards of rip-rap. This cost includes material, equipment, and labor. Total cost for full mitigation cannot be determined until total rip-rap quantities required for Reach 3 bank revetment are available from project engineers.

3.5.3.2 Replacement of Salmonid Spawning Riffle – Reach 3 Channel Realignment (One Increment). This increment consists of two measures. The first is a monitoring effort. The reviewing agencies supported the recommendation of the fisheries investigation for monitoring this site during and after project construction and restoration/replacement of the riffle if construction activities cause siltation and the subsequent loss of this aquatic habitat feature. Monitoring should occur twice during construction: immediately prior to Reach 3 channel realignment and toward the end of construction, to determine attributable siltation. Subsequently, this site should be examined before the first salmonid spawning season after project construction, probably in the month of November. If significant siltation, or other deterioration, is detected during either of these monitoring periods, remedial restoration/replacement measures should be implemented. Restoration will probably be achieved best through the construction of replacement spawning riffle to provide an equivalent spawning area (to be determined during monitoring activities). Monitoring will involve 3 days of a professional fishery biologist's time to measure gravel embeddedness and the area of usable gravels, at approximately $1,700 (a $65 per hour rate, including salary, fringe, and profit).

Best management practices (BMP's) for erosion control and siltation abatement at the Reach 3 channel realignment site may not alleviate the potential for spawning habitat impacts; however, every effort must be made to minimize siltation as much as possible by employing BMP's during construction. If riffle replacement is required at this site, then the design criteria and costs associated with spawning riffle replacement at the Montague Expressway crossing will be applicable to this site as well: $2,800 per 450 square feet of weir-retained salmonid spawning riffle (this riffle area and the associated mitigation cost are estimates for this site. Field verification will be required to ascertain the actual size of the impacted riffle).

3.5.3.3 Replacement of Additional Shade-Casting Riparian Vegetation Associated with Mitigation for This Flood Control Plan (One Increment, 1.8 Acres). Under this plan, mitigation for an additional loss of 1.8 acres of shade-casting riparian vegetation in Reaches 2 and 3 will be addressed through replanting and enhancement of undisturbed riparian areas, since most of the additional impacts are from the floodway bypass channel crossovers (three in Reach 2 and one in Reach 3). Unit costs are assumed to be the same as for the previously described stream shading increment ($21,875 per acre maximum), since enhancement plantings will incur a lesser cost. Total costs for achieving this mitigation objective are $39,375 as a maximum. Costs include plant and cutting acquisition and planting.

3.6 Comparison of Mitigation Plans and Incremental Costs and Determination of the Recommended Mitigation Plan

Table D-3 displays the estimated costs of mitigation increments associated with each fishery mitigation objective for the Lower Coyote Creek Flood Control Project. This analysis reveals that the least-cost fish habitat mitigation strategy is the "Alternative Sides Overflow Channel Plan," with onsite replacement/enhancement for all fish passage and habitat impacts. This mitigation plan has an overall estimated cost of $130,000 (but does not include E&D, O&M, and S&A costs for most of the measures). The "Same Side Overflow Channel Plan" mitigates by avoiding some of the impacts to 1.8 acres of stream shading riparian vegetation, a potential salmonid spawning riffle in Reach 3, and 725 feet of sparse emergent vegetative cover habitat, at an overall mitigation cost of $20 million. The Lower Coyote Creek fish habitat has been severely impacted by past land use practices, and it remains of marginal quality for use by anadromous salmonids. The mitigation measures comprised by the least-cost mitigation plan, in addition to the reduced need for channel maintenance clearing of streamside vegetation with the flood control project, may actually improve overall habitat conditions for anadromous salmonids and other native fishes through the enhancement of seasonal lake and spawning riffle habitats.

4. References

(1) John Stanley and Associates, Inc. 1989. Lower Coyote Creek Fisheries Evaluation Report. Prepared for the Santa Clara Valley Water District, San Jose, California. File No. 182-19. 49p. + four appendices.

(2) __________. 1990. Revegetation and Monitoring Plan for the Establishment of Riparian Trees and Shade Levels on Coyote Creek, Reaches 1B and 2A. Prepared for the Santa Clara Valley Water District, San Jose, California. Fisle No. 182-36. 25.

(3) Leidy, R. 1984. Distribution and Ecology of Stream Fishes in the San Francisco Bay Drainage. Hilgardia. 52(8): 175.

(4) McKinley, W. and R. Webb. 1956. A Proposed Correction of Migratory Fish Problems at Box Culverts. Fisheries Research Papers, Washington Department of Fisheries. 1(4): 13.

(5) U.S. Army Corps of Engineers. 1993. Final General Design Memorandum, Coyote and Berryessa Creeks, California, Coyote Creek. May.

Table D-3
Costs of Associated Measures Addressing Fishery Mitigation Objectives For the Lower Coyote Creek Flood Control Project

Mitigation Objective	Mitigation Measure	Cost[a]
Fish Passage		
Standish Dam	V-notch weir, sluiceway, and tidegate	$836 (E&D cost associated with dam)
Highway 237	Baffled low-flow channel and baffled side slopes	$14,828
Instream Habitat		
Tidal Creek Channel	5 levee breaks in old Leslie Salt ponds yielding 4,710 linear feet of channel	$6,750
Seasonal Lake	Dam placement decision with potential yield of 3,610 linear feet of lake	No project associated cost
Pool/Run	Replace with 290 linear feet of lake habitat	No project associated cost
Rocky riffle	250 feet of grouted boulder riffle habitat	$68,288
	250 feet of reinforcing steel anchored boulder riffle habitat	$31,860
Spawning Riffle	1,800 CF spawning gravel mixture spread among selected riffles	$2,900 + undetermined regular gravel replacement cost (assumed highest of alternatives)
	1,800 CF spawning gravel mixture spread among two sloped weir-retained riffles	$5,600 + undetermined regular gravel replacement cost (assumed lowest of alternatives)
	1,800 cy spawning gravel mixture spread on sloped, prepared, rock-lined channel at Montague Crossing.	$2,900 + undetermined regular gravel replacement cost (assumed lowest of alternatives)

Table D-3
Costs of Associated Measures Addressing Fishery Mitigation Objectives
For the Lower Coyote Creek Flood Control Project

Mitigation Objective	Mitigation Measure	Cost[a]
Nearshore emergent vegetative cover	Avoidance of impacting 725 feet of habitat	$6.7 million
	Replacement of habitat value with 2-foot diameter rip-rap along banks at channel crossovers	Total cost not available until rip-rap volumes are determined for this site, but approximated cost differential is $3,000 per 100 SY of rip-rap.
Potential spawning riffle habitat	Avoidance of impacting habitat	$6.7 million
	Monitoring and replacement, if necessary	$1,700 (monitoring) + $2,800 (replacement) or potentially $4,500 total
Stream Shading		
1.3 acres of shade-casting riparian vegetation in Reaches 2 and 3	Replanting to enhance sparsely vegetated areas (up to 1.3 acres)	$28,438 maximum estimate
1.8 acres of shade-casting riparian vegetation in Reaches 2 and 3	Avoidance of impacting habitat	$6.7 million
	Replanting to enhance sparsely vegetated areas (up to 1.8 acres)	$39,375 maximum estimate

[a] The least-cost mitigation plan increments for each mitigation objective are highlighted. Addressed are approximate costs for construction and implementation only, unless otherwise specified. Total costs for each mitigation increment will have to include E&D, O&M, and S&A which have yet to be determined.

Total Cost for "Alternate Sides Overflow Channel Plan" with fish habitat replacement/enhancement is approximately $130,000 (Total does not include cost of substituting larger rip-rap for bank revetment in Reach 3).

Total Cost for "Same Side Overflow Channel Plan" with avoidance of some fish habitat impacts and onsite replacement of lesser amounts of impacted fish habitat is approximately $20 million.